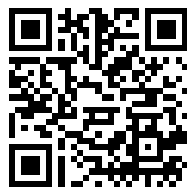


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REVISED SUPPLEMENT

1892

RELATING TO THE

AFRICA PILOT, PART III.

THIRD EDITION,

1889.

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PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

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LONDON:  
PRINTED FOR THE HYDROGRAPHIC OFFICE, ADMIRALTY,  
By DARLING & SON, LTD., 1-3, GREAT ST. THOMAS APOSTLE, E.C.,  
AND SOLD BY  
J. D. POTTER, AGENT FOR THE SALE OF ADMIRALTY CHARTS,  
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1892.

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1892

RELATING TO THE

# AFRICA PILOT, PART III.

5<sup>th</sup>  
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## ADVERTISEMENT TO REVISED SUPPLEMENT, 1892.

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THE portion of this revised supplement relating to the Zambesi and Shiré, was published in 1890 as a pamphlet and was included in supplement 1890. As amended, it cancels pages 209, line 14, to 222, line 23, of the Africa Pilot, Part III.

That relating to Pemba island, and the Mainland from Tanga bay northward to Malindi, is from the surveys and remarks of the late Commander T. F. Pullen, Lieutenant A. Balfour, H.M. Ship *Stork*, 1889-90, and information received from H.M. ships up to date, and cancels pages 388 to 398, to Mainland, and pages 404 to 416 line 24.

All Notices to Mariners relating to Africa Pilot, Part III., Third Edition, including No. 319 of 1892, the supplement 1890, and Hydrographic Notice No. 7 of 1891, are hereby cancelled.

W. J. L. W.

*Hydrographic Office, Admiralty, London,*  
15th August 1892.

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For information respecting the lights which are described in the Africa Pilot, Part III., seamen should consult the Admiralty List of Lights, Part V., South Africa, East Indies, &c. This Light List is published early in the current year, corrected to the preceding 31st December. The changes in the Africa Pilot, in lights and fog signals, to the date of this Supplement, will be found herein, in accordance with the paging of the volume.



*The existence of this revised Supplement is to be entered on the opening page of the Africa Pilot, Part III., Third Edition, 1889. The information contained in it is to be carefully considered.*

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SUPPLEMENT  
1892  
RELATING TO THE  
AFRICA PILOT, PART III.  
THIRD EDITION,  
1889.

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The following information is derived chiefly from the surveys and reports of H.M. Ships.—*See* advertisement.

The paragraphs are arranged in the order of the paging of the work ; the pages referred to will be found herein in the margin.

*All bearings are Magnetic.*

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CHAPTER I.

**ZANZIBAR COAST.—Territory.**—From the Rovuma river, pp. 6, 7, northern boundary of the Portuguese territory, to the mouth of the Umba river in about lat.  $4^{\circ} 41'$  S., including Mafia island, is now German territory. From the Umba river to the Juba river, including the adjacent islands, also the islands of Zanzibar and Pemba, belonging to His Highness the Sultan of Zanzibar, are now under the Protectorate of Her Britannic Majesty. The Juba is the boundary between the British and Italian spheres of influence. The Sultan of Oppias's territory on the coast, lies between  $2^{\circ} 30'$  N. and Ras Awath, in about lat.  $5^{\circ} 52'$  N. Amend pages 6, 7 and 361 from this information.

**Mail Communication.—Mails.\***—There is fortnightly communication between England, Cape Town, Port Elizabeth, East London, and Natal, both by the Castle Mail Packets and by the

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\* Cancels Mails on page 8 of the Pilot. Amend also in the Pilot the places affected.

p. 8. Union Steamship Company. Each Company have also an intermediate ocean service between those places. Also the Union Line despatch fortnightly a branch steamer on the arrival of their steamer from England, to Mossel bay, Knysna, Port Elizabeth, East London, Port Natal, and Delagoa bay. There is also intermediate communication between these places by the Castle Line, and monthly to Tamatave and Mauritius. Amend also in the Pilot, the places affected.

There is monthly communication from Lisbon by the Portuguese "Mala Real" Company to Mozambique and other East African ports, *viâ* the Portuguese West Coast of Africa ports and the Cape; but the service is very irregular. The British-India vessels have discontinued their service southward of Zanzibar; this is partly remedied by the Sultan of Zanzibar sending some of his steamers to Mozambique, thus facilitating communication with the northern ports. A German Steamship Company has recently started monthly communication, *viâ* Suez Canal, with the East African ports. For Zanzibar, *see* also pp. 52-54 of this supplement, and p. 373 of the Pilot.

p. 25. Line 22. Insert a semicolon after the word *increased*.

p. 26. Line 22. Insert as a footnote.—During the month of February 1891, the southerly set of the current along the coast was experienced by several vessels, considerably southward of Lamu. The north-east monsoon was unusually strong.

p. 34. Line 15. For 7° E. *read* 70° E.; line 20, for Chagos *read* Maldives.

---

## CHAPTER II.

p. 45. **Time Signals.**—The ball is dropped, and the gun fired, at 1h. 30m. Cape Colony mean time, corresponding to Greenwich mean noon.

p. 62. Line 1. For 2500 *read* 220 yards.

p. 62. Lines 22 and 23. The disc falls at 1h. 30m. Cape Colony mean time, corresponding to Greenwich mean noon.

pp. 71. 77 **Wrecks westward of Cape Agulhas.**—Information has been received through the Board of Trade. that the steam vessel *Alcestis*, on a voyage to Mauritius, struck on an obstruction off cape Agulhas, and finally foundered.

The particulars relative to this accident do not suffice to enable the position, or nature, of the obstruction to be accurately described, but it is believed the vessel struck on a wreck lying about  $2\frac{3}{4}$  miles W.  $\frac{1}{4}$  N. from cape Agulhas lighthouse, or in approximately lat. 34° 51' S., long. 19° 58' E

The *Alcestis* finally sank in 17 fathoms water, about  $5\frac{1}{2}$  miles N.W.  $\frac{3}{4}$  W. of the above position, or in approximately lat.  $34^{\circ} 50\frac{1}{2}'$  S., long.  $19^{\circ} 58'$  E.\*

### CHAPTER III.

**Knysna river.—Pilots.**—A pilot house, painted white, has been p. 92. erected on the summit of Outer Obelisk point, and the signal staff hitherto on Inner Obelisk point, removed to the pilot house, forming the signal station for Knysna harbour. The house is visible from a considerable distance seaward, and is a good landmark.

**Glassen and Chelsea points.—Foul ground.**—From the pp. 105, report of a Court of Inquiry, held at port Elizabeth in 1890, into 106. the loss of the S.S. *Strathblane*, by striking on a rock near the shore westward of cape Recife, it appears that foul ground may exist about one mile from the shore westward of Chelsea point for a distance of about 5 miles. Further, it is not improbable that the unsounded area fronting the coast between Chelsea point and Glassen point may contain many hidden, and as yet unknown, dangers.†

### CHAPTER IV.

**CAPE RECIFE LIGHT**, *revolving white*, is now visible in p. 109. all directions, but shows *red* in Algoa bay from the bearing of S.W.  $\frac{1}{2}$  S. to S. by W. to warn vessels of too near an approach to Dispatch or Roman rock.‡

**Time signal.**—The ball is dropped at 1h. 30m. Cape Colony mean p. 112. time, corresponding to Greenwich mean noon.

**PORT ALFRED.** Lines 10 to 13. Omit after the word *embank-* p. 127. *ments* and insert—terminating in piers constructed with concrete blocks of an average breadth of 70 yards. Vessels of 10 to 11 feet draught can enter the river at high water.

Lines 19, 20, omit remainder of sentence after the word, *quays*.

Omit sentence on 9 and 10, and insert.—In fine weather, †vessels p. 128. of 10 to 11 feet draught, with the assistance of a pilot, may cross the bar, but at present no tug is available, and only small coasting craft within the draught mentioned, use the port.

Omit bottom line except last letter (A).

p. 129.

Lines 1 to 3; omit the remainder of sentence, from the word, p. 130. *purposes*.

\* Originally published in Notice to Mariners, No. 208 of 1892.

† See Admiralty charts :—Cape St. Francis to Waterloo bay, No. 2085; and Algoa bay, No. 642. Originally published in Notice to Mariners, No. 134 of 1890.

‡ Originally published in Notice to Mariners, No. 394 of 1890.

p. 130. Lines 4 and 5; omit the remainder of sentence, from the word, *draught*.

Lines 11 and 12. There is no tug at present.

**Time signal.**—The ball is dropped at 1h. 30m. Cape Colony mean time, corresponding to Greenwich mean noon.

p. 131. **Riet (Reid point) reef.**—As rocks have been more than once vaguely reported to exist some distance beyond Riet point reef as charted, mariners should give the point a berth of at least 3 miles.

p. 141. Line 5. Omit the word *apparently*.

p. 142. **BUFFALO RIVER.—Landing.**—Omit lines 5 to 11 from bottom, as the surf-boats are discontinued, in consequence of the bar allowing vessels of  $15\frac{1}{2}$  feet draught to enter the river under favourable circumstances.

Lines 1 to 4 from bottom probably still apply to the bar; but the words *signals for the surf-boats* should be omitted.

p. 142. **Beacons.**—To distinguish the coast in the neighbourhood of Buffalo river, the two undermentioned beacons have been erected:—

A wooden pyramidal beacon, its top 381 feet above the sea, is situated on a hill about  $14\frac{1}{2}$  miles westward of East London. The beacon, 51 feet high, and coloured black, stands on an equilateral triangular base (each side of the base 27 feet) and terminates in a sharp point. It should be seen in clear weather from a distance of 23 miles. The hill, green, flat topped and smooth, is 330 feet above the sea, and about  $1\frac{1}{4}$  miles from the shore. Approximate position, at.  $33^{\circ} 9' S.$ , long.  $27^{\circ} 40' E.$

A wooden pyramidal beacon, surmounted by a ball, 368 feet above the sea, is situated on a hill about 15 miles eastward of East London. The beacon, 52 feet high, and coloured black, stands on an equilateral triangular base (each side of the base 29 feet, each side of the top  $1\frac{1}{4}$  feet, and the ball 10 feet in diameter). It should be seen in clear weather from a distance of 21 miles. The hill, green, flat topped and smooth, is 316 feet above the sea, and about one mile from the shore. Approximate position, lat.  $32^{\circ} 50\frac{1}{2}' S.$ , long.  $28^{\circ} 6\frac{1}{2}' E.$

p. 143. **Time signal.**—The ball is dropped at 1h. 30m. Cape Colony mean time, corresponding to Greenwich mean noon.

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## CHAPTER V.

p. 164. Line 11 from bottom. *Add*—On the south side of the Untamvuna river there is a strip of sand up the side of a wooded hill, which shows like a road; coming from the northward it opens out on a W. by N. bearing. The south point of the Umtentu river is marked

by a quoin-shaped hill. There is a large house on the south bank of the Izotsha river, 2 miles southward of port Shepstone.

**Umtitchwana or Umzinto bay**, about one mile northward p. 165. of the Umzinto river, and 2 cables southward of Umzimayo river, is now used for landing purposes.

**ALIWAL SHOAL.—INTENDED LIGHTS.**\*—Information p. 165. has been received, that probably during the year 1892, two lights, as undermentioned, will be exhibited from lighthouses in course of construction about 8,797 yards apart, to mark Aliwal shoal, approach to port Natal from the south-west :—

1. The northern light, to be shown from the headland northward of Amahlongwana river entrance, will be a *fixed* light, showing a sector of *red* light in the direction of Aliwal shoal over an arc of  $50^\circ$ , between the bearings of N.  $30\frac{1}{2}^\circ$  W. and N.  $19\frac{1}{2}^\circ$  E., and a sector of *white* light for  $20^\circ$  on each side of the *red* light, to the bearings N.  $50\frac{1}{2}^\circ$  W. and  $39\frac{1}{2}^\circ$  E. It will be 176 feet above high water, and should be visible in clear weather from a distance of about 10 miles.

The lighthouse, constructed of iron, will be 23 feet high, conical in shape, and painted red and white in horizontal bands. Position, lat.  $30^\circ 13\frac{1}{2}'$  S., long.  $30^\circ 47\frac{3}{4}'$  E.

2. The southern light, to be shown from the headland southward of Umpambinyoni river entrance, will be a *fixed* light, showing a sector of *red* light in the direction of Aliwal shoal, over an arc of  $36^\circ$ , between the bearings of S.  $82^\circ$  W., and N.  $62^\circ$  W., and a sector of *white* light for  $27^\circ$  on each side of the red light, to the bearings S.  $55^\circ$  W., and N.  $35^\circ$  W. It will be elevated 165 feet above high water, and visible in clear weather from a distance of about 10 miles.

The lighthouse, constructed of iron, will be 23 feet high, conical in shape, and painted red and white in horizontal bands. Position,  $30^\circ 17\frac{1}{4}'$  S., long.  $30^\circ 45\frac{1}{2}'$  E. The keeper's cottage stands southward of the south light.

It will be evident that a vessel passing, must be about  $5\frac{1}{2}$  miles seaward of Aliwal shoal in order to keep but one red light in view, and that both red lights can only be seen at once if the vessel is nearer than that distance to the shoal; or, when taking the inner channel, the vessel must pass midway between the shoal and the shore in order to keep but one red light in sight.

**The Scottsburg landing**, now disused, is situated just south- p. 166. ward of the mouth of the Umpambinyoni river, on which is the township of Scottsburg.

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\* Originally published in Notice to Mariners, No. 172 of 1892.

- pp. 169,  
170. **NATAL.—Bar.**—The breakwater is still in course of extension. The bar had an average depth of 10ft. lin. in 1890, against 11ft. 4in. for the year 1889. The average maximum depths were in the months of June, November and December. The least average monthly depth was 9ft. 4in. in September. Maximum draught that entered the port was 16ft. 8in.
- p. 172. The bar in 1890 was impassable for  $15\frac{1}{2}$  days, and dangerous for 35 days, as against 21 and 43 days respectively in 1889.
- p. 181. **Boundary.**—After line 13.—About midway between Sordwana bay and point, or lat.  $27^{\circ} 19'$  S., is the boundary on the coast between Zululand and Tongaland.
- pp. 182,  
194. **DELAGOA BAY.\*—Inyack Island.**—The white barrack is partially hidden by small trees, but its red roof is distinguishable. Page 182, line 12, and page 194, line 16.
- p. 183. **Cockburn and Hope shoals.—Buoyage.**—A black conical buoy with staff and triangle marks the north extreme of Cockburn shoal, south side of Cockburn channel, with cape Inyack bearing S.S.E.  $6\frac{3}{10}$  miles, and Gibbon point beacon S.S.W.  $\frac{1}{4}$  W. A red spherical buoy is placed near the  $3\frac{3}{4}$  fathoms patch of Hope shoals, in  $5\frac{1}{2}$  fathoms, with Inyack hill bearing S.  $\frac{1}{2}$  W. distant 9 miles.
- p. 184. **Lech reef.**—A red buoy is placed in 6 fathoms near the edge of Lech or Ribiero reef, with Elephant island beacon S.S.E.  $\frac{3}{4}$  E. distant  $5\frac{8}{10}$  miles. Vessels should give it a berth of half a mile when passing southward, and  $1\frac{1}{2}$  miles when passing eastward of it.
- Caution.**—The buoys in Delagoa bay are not to be depended on.  
Line 31. For red streak 177ft. *read* white house (barrack).
- p. 185. Line 19. Omit the words *existence doubtful*; the beacon was in position in February 1890.
- p. 187. Line 3. Omit the words *for a distance of 5 miles*.  
Line 5. For should bear *read* bears.  
Line 7 from bottom, after the word *tide*. Insert—and northward of the red buoy, if in position, but it must not be depended on.  
Line 10 from bottom. For S.E. *read* S.W.
- p. 188. **English River.—Beacons.**—Line 21, omit the words, *their positions are not definitely known*, as the beacons are now charted. The outer beacon is on the shore line, S.  $46^{\circ} 30'$  W. (true) from Reuben point light. These beacons are white structures surmounted by discs, as are also those on Shefina and Gibbon points.

---

\* See Admiralty charts, Delagoa bay, No. 644; also Nos. 646, 648 and 2089.

† Topmark gone (1892).

Lines 23 and 24. For red buoy *read* black buoy, and for 19ft. p. 188. *read* about 15ft.

**Bar.**—H.M.S. *Magicienne*, April 1891, found a depth of 22ft. across the bar, extending for at least a mile, one hour before high water.

Line 4 from bottom. The leading mark in, is the upper beacon well open southward of the lower one.\*

Line 9. This mud flat is reported to have extended. p. 189.

**Limpopo river.**—A depth of 21 feet at high water was found on p. 195. the bar in 1890, but it is not to be depended on.

**Zavora river.**—**Shoals.**—A shoal of  $2\frac{1}{2}$  fathoms, on which the p. 196. S.S. *Courland* was said to have struck, is charted 6 miles southward of Zavora river, in lat.  $24^{\circ} 58'$  S., long.  $34^{\circ} 22\frac{1}{2}'$  E.; the position, amended is lat.  $24^{\circ} 57'$  S., long.  $34^{\circ} 25'$  E., but both positions are placed on the charts.

The *Countess of Carnarvon* reports a shoal of  $2\frac{1}{2}$  fathoms, on which the sea occasionally breaks, in lat.  $24^{\circ} 57'$  S., long.  $34^{\circ} 22'$  E. They are possibly identical. The coast between Zavora point and to the westward of the Limpopo river is entirely unsurveyed, and should be given a wide berth.†

## CHAPTER VI.

**INNAMBÁN RIVER.**—**Buoyage and Beacons.**‡—To pp. 199. facilitate the pilotage of Innambán river entrance, and to indicate 200. the channel towards Innambán, the five undermentioned buoys have been placed as follows (other buoys heretofore shown on Admiralty Chart, No. 650, having been withdrawn), and three beacons erected :—

Four of these buoys are painted red, and should be left on the port hand entering the river; and one buoy, painted black, should be left on the starboard hand.

1. Bar buoy, painted red, is moored on the south side of the channel over the bar in  $3\frac{1}{2}$  fathoms, with Burra lighthouse bearing S.  $\frac{1}{4}$  W., and Algoa point clump W. by N.  $\frac{1}{4}$  N.,  $3\frac{1}{10}$  miles.

2. A buoy, painted red, is moored on the north-west edge of the bank on the southern side of the river entrance, in 6 fathoms, with the Pedestal on Lingalinga peninsula W.  $\frac{1}{8}$  S., distant  $\frac{1}{10}$  miles.

3. A buoy, painted red, is moored on the northern end of the spit

\* H.M.S. *Magicienne*, 1891.

† See Admiralty charts, Nos. 648 and 597. Originally published in Notices to Mariners, No. 523 of 1891 and No. 52 of 1892.

‡ See Admiralty plan of Innambán river, on No. 650. Originally published in Notices to Mariners, No. 139 of 1890.

p. 199, 200. westward of Mafarun islet, in 17 feet water, with that islet bearing S.E.  $\frac{1}{2}$  E., distant 8 cables.

4. A buoy, painted black, is moored on the western side of the channel, in 17 feet water, with Mafarun islet bearing S.E. by E.  $\frac{3}{4}$  E., distant  $1\frac{1}{10}$  miles.

5. A buoy, painted red, is moored on the east side of the channel, in 4 fathoms, with Makukoni point S.S.E., distant  $1\frac{2}{10}$  miles.

The three beacons are :—

- (a.) A beacon, named the Pedestal, constructed of masonry, and situated on the coast of Lingalinga peninsula, with Algoa point clump bearing N.E. by N., distant  $2\frac{6}{10}$  miles nearly.
- (b.) A beacon, constructed of wood, four sided, and surmounted by a disc, painted white, has been erected about 300 yards S.  $\frac{1}{2}$  W. from Double Bush (Three trees) hill.
- (c.) A beacon, of the same shape and colour as *b* beacon, has been erected on the western bank of the river, with Obra bearing N.N.E. and Makukoni point E.  $\frac{3}{4}$  S.

**Directions.**—The leading mark over Innambán river bar, is the Pedestal in line with Double Bush beacon bearing W. by S.  $\frac{1}{2}$  S. (leading nearly  $2\frac{1}{2}$  cables northward of the bar buoy) ; having crossed the bar, the course should be altered to pass westward of buoy No. 2 ; a course should then be steered to pass between buoys No. 3 (red) and 4 (black) ; and thence to pass westward of buoy, No. 5 ; the leading mark—Left tangent of Shikaki cliff in line with Summit, bearing N.  $\frac{1}{2}$  E. astern—should then be followed to the anchorage off Innambán.

At the entrance to the bar, and near the bar buoy, depths of 17 feet have been obtained at high water neap tides, but there is almost always a heavy swell, and vessels drawing more than 14 feet should not enter the river without a pilot.

At times the sea breaks right across the river entrance ; when such is the case, only steam vessels of good power and light draught should attempt to cross the bar.

**Caution.**—The bar is subject to change and the buoys are not to be depended upon. Most of the outer buoys were adrift in 1891.

p. 208.

**PUNGUE RIVER.\*—General remarks.—Aspect.**—The land about the mouth of the river is very low, and if coming from the southward cannot be seen until close to the outer buoy. To the northward of the river a series of low sand hills covered with scrub extend along the shore, off which the water appears to be very

\* See Admiralty plan of river Pungue, No. 1003 ; scale, *m* = one inch ; also coast sheet, Delagoa bay to river Zambesi, No. 648. Information chiefly from H.M.S. *Brisk*, 1891, and H.M.S. *Raccoon*, 1892.

shoal, 6 and 7 fathoms having been obtained at about a distance p. 208. of 6 miles. On nearing the outer buoy, Massique point shows up well, making as a dark bluff point, caused by the tall straight trees which grow down to the water's edge. The Chirora group of palms to the southward will also be easily recognised for they are the only palms growing in the vicinity; also the beacon recently erected near Macuti point and mentioned below.

After passing the outer buoy, the masts of the shipping will be visible over Beira, and as No. 2 buoy is approached, the tower on Chiveve point and the iron buildings, forming the settlement will be visible.

**Bar.**—The entrance of the river is obstructed by numerous banks which extend some distance off the land, and partially dry at low water springs. There is, so far as is known, no outer bar, but a fairly wide navigable channel (marked by four buoys) exists, which has from 4 to 5 fathoms at low water up to No. 3 buoy, 3 miles southward of Massique point. Off this point there is an inner bar, extending right across the channel and about a mile in width, over which the depth may not exceed 13 feet at low water springs.\*

**A shoal**, with 8 feet water, over a bottom of sand and mud, has been found between Nos. 3 and 4 buoys, with Chiveve point bearing N.N.E.  $\frac{1}{4}$  E., and Massique point N. by W.  $\frac{3}{4}$  W. distant  $2\frac{2}{10}$  miles.†

**Buoys and Beacons.\***—From the latest information, the positions of the buoys were as follows:—Outer buoy No. 1 with centre of Chirora palm clump bearing W. by N.  $\frac{1}{2}$  N. distant  $9\frac{5}{10}$  miles; No. 2, with clump W.N.W. distant  $7\frac{5}{10}$  miles; No. 3, with clump N.W. by W.  $\frac{5}{8}$  W. distant  $3\frac{1}{10}$  miles; No. 4, with clump W. by S.  $\frac{5}{8}$  S. distant  $2\frac{1}{10}$  miles.

A skeleton wooden tower, 80 feet in height has recently been erected at a quarter of a mile E. by S. of Macuti point, visible some distance beyond the outer buoy under favourable circumstances.

Also at  $1\frac{1}{2}$  cables S.S.W. of Chiveve point stands a corrugated tower of iron, 60 feet in height, painted white on its sea face and red on the others. The Portuguese flag is hoisted on the flagstaff on its summit. This tower is visible from about abreast No. 2 buoy.

**Directions.**—If certain of the vessel's position a course may be shaped for the outer buoy; otherwise it is advisable to make the sand hills to the northward of the entrance and then steer to the southward a distance of 5 to 6 miles from the shore, and keep in not

\* The plan shows 16 feet in the fairway. No dependence must be placed on the buoys maintaining their assigned positions, and the chart and directions must be used with caution.

† Originally published in Notice to Mariners, No. 265 of 1892.

p. 208. less than 7 fathoms. When the sand hills cease, a good look out should be kept for the outer buoy.

The outer buoy, a large conical black buoy with staff and cage, visible about 5 miles, should be approached between the bearings of N.W. and W.S.W., this will keep a vessel clear of the banks which extend for a long distance on either side off the shore.

On nearing the outer buoy, the land will gradually become visible, as before stated, also the tower near Macuti point.

Pass the outer buoy close-to, and steer West for No. 2 buoy, which is can-shaped. On reaching No. 2 buoy, pass to the northward of it and steer W.N.W. for No. 3 buoy, which will be seen nearly in line with the Chirora group of palms. Keep a straight course northward the buoys and watch the tide; this will lead in the best water and northward of the banks on the south side of the channel, which abut close to the fairway. Pass to the northward of No. 3 buoy, and haul up N.N.W. for No. 4 buoy, avoiding the 8 feet patch situated about midway between them.

On nearing No. 4 buoy, if entering on the flood, alter course to northward in good time to avoid being swept on to the bank extending from Massique point. Within No. 4 buoy is the bar, with 13 to 16 feet at low water, and about one mile across; inside the depth again increases to 4 and 5 fathoms. To cross the bar, steer for Chiveve tower bearing N.E.  $\frac{3}{4}$  N., and when the water deepens, or Massique point bears West, steer for the anchorage, allowing for the stream, which, here, sets obliquely across the ship's course.

Avoid the bank off Beira and anchor as convenient off Chiveve creek.

**Caution.**—It is necessary to guard against being swept on to Massique bank. The bottom is, however, soft, and will do no damage. Should the vessel touch, anchor and wait for the tide to rise.

The banks off Massique point and Beira are reported to be extending, and several steamers were ashore on them during the *Brisk's* stay in the river.

Above Beira the river is intricate; the navigable channel is very winding, and the banks and crossings are continually changing, thus rendering it impossible to attempt ascending without local knowledge. The streams also are very strong, and a boat touching one of the banks is liable to be capsized by the rush.

**BEIRA.**—Beira, which is a Portugese military station, is situated on point Jea or Chiveve spit, east side of entrance, and consists of a stockaded fort and a camp composed of tents and iron huts.

The settlement is nearly an island at high water, and at high river

during springs is sometimes inundated. At low water it is surrounded by swamps of black mud. The land about the settlement of Bangué, north-eastward of it, is under water during high river at spring tides.

**Landing.**—The best landing place for boats is at the end of the spit, just inside Chiveve creek, and from there a tramway runs along the top of the beach to the fort, inside of which there are two red tile roofed houses, one the house of the Commandante, the other the barracks for the troops.

**Anchorage.**—The anchorage for men-of-war is just off the fort, in from 4 to 5 fathoms; and for merchant vessels, just off the entrance of the creek, above the men-of-war anchorage, in about 6 fathoms.

**Supplies.**—At present, fresh provisions are not procurable, but a few vegetables and a little fruit may be obtained from the natives coming from the Buzio river (*see* page 6). Canned provisions of all descriptions can be procured at the stores which have been established by firms from Natal and Cape Town; prices are of course very high.

Game of all sorts abound on the banks of the river; buffalo, quagga, wild pig, and all kinds of buck were shot, as were also geese, ducks, quail and the koran or lesser bustard. Lions and wolves were numerous, four lions and two wolves were shot in one night near Nova-Feireiras, about 50 miles up the river. Alligators swarm and hippopotami are numerous in the river.

**Water.**—There is no good drinking water obtainable on shore, the inhabitants have to fetch theirs from a distance of 5 miles and this at the best is very brackish.

**Money.**—Portuguese currency is in general use, but English money is also taken at any of the stores.

**Communication.**—The Castle and Union steamers now call at Beira, both on their way to and from Mozambique.

Their dates of call are uncertain, but once every three weeks is the average. The Clan line also call about once a month on their way to India, and occasional visits are also made by the Portuguese Mala Riale and German East African line of steamers.

**Climate.**—According to reports of people who have been some time at Beira, the rains commence about October and the rainy season lasts for about 3 months.

About the middle of January the river is high, and keeps so until about the end of February when it begins to fall, reaching its minimum about the end of August.

During the *Brisk's* stay of three months (June to August) the

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climate was very pleasant, maximum temperature being 80°, minimum 60°. The nights during these months were cold and very damp, heavy mists and fogs hanging over the river, and not clearing away until between 8 and 9 in the morning.

Light Southerly to S.E. breezes prevailed but calms were frequent.

**Tides and Tidal Streams.**—The tidal streams are very strong, especially when the river is high, as much as 6 knots at the junction of the Pungue and Buzio, and they have to be carefully guarded against when navigating the channel, especially when passing No. 4 buoy, for the flood stream sets very strongly on to the bank off Massique point, and vessels are swept on shore before the strength of the stream is recognised. A point and a half has occasionally to be allowed to counteract the effect of this stream and keep the vessel in the centre of the fairway.

At Beira the flood stream was found to run for only four hours during springs, and about five at neaps, and there was no time of slack water between the change of the streams. High water, full and change, about 5h. 0m., springs rise about 15 feet, neaps about 8 feet.

At Mapanda, above Beira, it was high water about six hours after Beira, the stream only running up for about one hour each tide; the rise and fall being about 18 inches at springs and 9 inches at neaps. This was during July, the middle of the dry season.

**Above Beira** the river is navigable for vessels of about 4 feet draught during high river (about January to May, being highest in March) for about 100 miles, and during ordinary low river for about 50 miles, but at times, during very low river, it is only navigable to Namacade point, just below Mapanda, by canoes, except at near spring tides. Vessels of about 9 feet draught can ascend about 12 miles (*see* Caution, p. 14). For about 70 miles above the entrance the country is nothing but a swamp, with isolated patches of ground a few feet above the water; consequently there are but few inhabitants.

**Settlements.**—Nova Feireiras, about 50 miles up the Pungue river, is a Portuguese military station, and so also are Mapanda and Sarmento. Mapanda is in about lat. 19° 23½' S. A steam launch, with flood tides, takes 8 hours or more to go from Beira to Mapanda.

The British South African Company are now making a road from Mapanda to Massi-Kesse, and a steam tramway is to be laid down

through the Tsetse fly district, which extends for about 50 miles p. 208. from that place.

**Buzio river**, which discharges westward of Massique point, west point of entrance to the Pungue, is navigable for vessels of 9 feet draught for a distance of 25 miles. It offers better facilities for a railway, as at 2 miles above the entrance the land is elevated a few feet above the swamp, and is never flooded. Five miles up, the land is cultivated, with numbers of kraals and natives. A good depth of water, in places as much as 8 fathoms, was found for a distance of 10 miles up the Buzio. The natives are peaceable and industrious, cultivating manioc, rice, and bananas.

### ZAMBESI AND SHIRÉ RIVERS.

(Page 17 to page 48 of this Supplement supersedes page 209, line 14, to page 222, line 23, of the Africa Pilot, Part III.)

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The Zambesi is a river subject to great fluctuations of depth. pp. 209-222. During the rainy season it floods, the water rises from 15 to 20 feet, sweeping down with great rapidity, and fills all the valley.

At the height of the dry season the stream is reduced to channels of water winding between dry sand banks, with here and there shallows, which even a draught of 18 inches can scarcely pass. The channel of one year becomes a bank the next, and there is no permanence in either direction or depth of the navigable passages.

It forms a large delta, through the several mouths of which it discharges to the sea.

All of these have bars which similarly change in depth from year to year. At one period, one mouth is the deepest; at another period, another.

To within the last few years the Kongoni mouth was considered the most practicable, but attention was in 1888 called by Mr. D. Rankin to the Chinde mouth, which, on examination, proves to have 7 feet at low water, or 19 at high water, and is now the best entrance. How long it may remain so is yet to be seen. See page 22.

In the following pages the entrances will first be described, and then the characteristics and details of the river, and of its important tributary, the Shiré, which falls into the main river at about 110 miles from the sea.

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**ZAMBESI DELTA.\*—General remarks.**—The Delta may be said to comprise the Melambe, Inhamissengo or Kongoni, East Luabo, Muselo, the Chinde, the Inhaombe, entered from the Chinde, the Inhamiara, entered by the Inhamhona or Maria mouth, and possibly also the Linde. The Chinde, which has a depth of about 19 feet at high-water springs, and the Inhamissengo, with about 3 to 5 feet less, are the best entrances to the Zambesi; but these depths, as well as those on the bars of the other mouths, and also the direction of the best water, are subject to constant alteration, causing any directions that may be given to shortly become obsolete. The large body of water which runs out of the various mouths during the rainy season, and the continued heavy ocean swell so alter the positions of the several bars, and even cause islands to form and wash away, that the entrances are never two seasons alike, and should never be attempted without a pilot, or first sending a boat in to sound. During the southerly monsoon, the dry season, they are the most dangerous, *see* seasons, p. 26.

The bars will probably have a maximum depth from the end of February to early April, when the river is in high flood, and a minimum depth from July to early November, especially the latter portion, the end of the dry season. Details of each bar are given separately. Vessels of about 10 feet draught, can ascend the Delta about 35 miles, as far as Mchenga, 5 miles above the junction of the Chinde with the main stream, at all times of the year; beyond this, in February and early March, the same draught could possibly on emergency go up to Tete, about 300 miles, or to the rapids 20 miles above it; also up its tributary, the Shiré, but not without occasionally getting aground, and there is the possibility of being detained until the next rise of the river. It is not recommended for vessels above 5 feet draught. After March the river falls rapidly.

Vessels of 18 inches draught only can navigate to the rapids, about 20 miles above Tete, or to the Murchison falls on the Shiré, at all seasons of the year. *See* inland navigation, (seasons), pages 25–27.

**Aspect.**—The land forming the mouths of the Zambesi is low, the tops of the trees nowhere exceeding from 50 to 80 feet in height, and the similarity of the appearance of the different mouths renders it somewhat difficult to distinguish them. The East Luabo, the main and straightest entrance, is the most easily distinguished from its being nearly 2 miles wide, whilst the others are mostly

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\* *See* Admiralty plans :—Mouths of the Zambesi, No. 2,865, sketch survey of river Chinde, No. 1,421, plan of Zambesi and Shiré rivers, No. 1,577, and Admiralty charts Nos. 1,810 and 597.

narrow; it lies also between two comparatively lofty and densely wooded points, the trees on which are remarkable (*see* view on chart 2,865), the light shewing between their straight bare trunks give them a resemblance to cliffs when seen from a distance; the bar, however, extends about  $3\frac{1}{2}$  miles off-shore. pp. 209-222.

The Inhamissengo may be known, on a near approach, by its lighthouse, beacon, and flagstaff; and the Chinde by a small group of palms standing within Mitaone point.

The Delta is but sparsely inhabited owing to a large portion of it being some feet under water when the river is in flood, especially at or near spring tides. Villages and clearings exist on the higher grounds, some of the dwellings being on piles; but it is not until the junction of the Chinde is passed that the land becomes higher and better populated and cultivated.

The lead is of much assistance when approaching the Delta of the Zambesi, the soundings decreasing from 20 fathoms at about 25 miles off, to 7 fathoms at about 4 miles, from which depth the soundings decrease regularly to the bars of the rivers, which are from 2 to  $3\frac{1}{2}$  miles off-shore.

The different entrances to the Zambesi will first be described.

**MELAMBE MOUTH** of the Zambesi lies 6 miles eastward of the West Luabo (which has not, as far as is known, any connection with the Zambesi), and  $3\frac{1}{2}$  miles westward of the Inhamissengo, of which river it is the western mouth. Its entrance appears to be choked with sand banks; it has not, however, been examined.

**INHAMISSENGO (KONGONI) MOUTH** is the mouth next eastward of the Melambe, midway between the west and east Luabo, and, with the exception of the Chinde, p. 22, is the best entrance to the Zambesi.\* It extends about 15 miles in a not very winding course to the northward, with depths of from 2 to 5 fathoms; it then divides into two branches; Madarandanda, the eastern and navigable one, is a creek about 30 yards wide, and about 3 miles long, at which distance it connects with the Zambesi; it is said to have a depth of two fathoms at low water.\* The western branch is named the Doto or Muselo, but apparently is shallow and not used; it enters the Zambesi opposite the Chinde.

It was by the eastern branch that the expedition under Dr. Livingstone entered the Zambesi, and the observation of all those who have visited these rivers (previous to the examination of the Chinde mouth in 1889) led to the conclusion that the best method of

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\* As regards trade, the mouth is practically abandoned, for that of the Chinde.

pp. 209-222. entering the Zambesi was by the Inhamissengo (Kongoni). Were it not for the connection with the Zambesi, it would not be of any importance. There is a boat channel within the bar, named the Inhangurue, which communicates with the East Luabo 3 or 4 miles from its mouth, but at times this channel is blocked up.\* See inland navigation on page 25.

**Bar.**—The Inhamissengo is fronted by sand banks and breakers to the distance of  $1\frac{1}{2}$  miles, at which distance they are connected by a narrow sand ridge, with depths of 2 to 5 feet at low water springs, or 14 to 17 feet at high water springs, the greater depth usually being found during the height of the rainy season, or December to March. A steam vessel drawing 12 feet water has crossed the bar, which at times is possibly available for vessels up to 15 feet draught.

**The settlement,** created in 1881, at the south-east corner of Inhamissengo island, is situated on low land, on which the river has encroached considerably.

The settlement of Conceição is 13 miles up the river; here was, formerly, a Portuguese military commandant with a detachment of soldiers, and several European trading factories, but the trade is mostly diverted to the Chinde.

**Light.**—A *fixed red* light is exhibited from a lighthouse, painted white, on the western side of the entrance to the Inhamissengo, at an elevation of 85 feet; it is intended to be visible from or beyond the outer anchorage, but it must not be depended on.

**Beacon.**—A mast beacon, 30 feet high, with triangle, stands in front of the lighthouse, about 200 yards southward from the flagstaff.

**Buoys.**—A bar buoy usually lies just within the bar in 9 feet water; a second buoy in 16 feet marks the west extreme of the spits extending from Inhangurué island nearly across the channel; these buoys must not be depended on. The channel is westward of the buoys.

**Pilot.**—There is a pilot for the bar.

**Anchorage.**—The most convenient anchorage for communicating with the shore, is with the gap in the land bearing about North, in about  $4\frac{1}{2}$  fathoms, sand; but except in fine weather vessels should lie farther out, say in 7 fathoms at 4 or 5 miles from the shore. The current generally sets to the westward, causing vessels at anchor to lie broadside to the usual S.E. wind, and to roll a good deal.

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\* See enlarged plan of Inhamissengo entrance on Admiralty chart No. 2,865.

**Directions.**—Vessels proceeding to the anchorage off the Inhamissengo, should make the East Luabo first, unless certain of their position, as its entrance is more easily discernible from its much greater breadth. Having made that mouth, steer to the westward along the coast, keeping in 4 or 5 fathoms, until the beacon, light-house, or flagstaff bearing the Portuguese flag on the west point of entrance of the Inhamissengo, are seen, where anchorage should be taken up as above directed. If wishing to enter the river, the services of the pilot should be obtained, or the bar, which is subject to alteration, examined before doing so. pp. 209-222.

The leading mark for the bar in 1888, was the flagstaff, lighthouse and beacon in line, bearing N. by W.  $\frac{1}{4}$  W.\*

Within the bar the channel deepens. Pass the west point of entrance at the distance of one cable, and anchor off the settlement in about  $3\frac{1}{2}$  fathoms. In crossing the bar a probable westerly set must be guarded against. At low water the surf breaks right across the bar, and the channel cannot be distinguished.

**Tides.**—It is high water, full and change, at 4h. 30m.; springs rise about 12 feet. The ebb tide at springs runs 4 to  $4\frac{1}{2}$  knots off the settlement, and at low tide the river water is generally fresh.

**EAST LUABO**, known also as the Zambesi, is  $1\frac{3}{4}$  miles wide in its entrance, and is the main outlet of the Zambesi river.

First Bluff point, on the western side of entrance, so called from its high straight trees standing very close together, and Hyde Parker point, on the east side of entrance, which from the view on plan No. 2,865, is a remarkable object, coupled with the wide entrance between them, afford the means of identifying it.

**Bar.**—The shallow water around the mouth of the East Luabo extends about  $3\frac{1}{2}$  miles seaward of the entrance, rendering it more dangerous than the Inhamissengo. The sand bank from the east point extends nearly across the mouth of the river, leaving a passage about a quarter of a mile wide between it and the bank on the western side. The sea at low water breaks completely across the passage, at which time a great portion of the banks are uncovered.

The depth on the bar at low water springs was (1859) about 4 feet. Discoloured water is seen a considerable distance off-shore at times, but on one occasion, in the month of June (1860), two days were occupied without finding a channel across the bar, which is said to be impracticable during the south-west monsoon, or dry season.

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\* The least depth on the bar was 2 feet, in October 1888, at the end of the dry season; the greatest depth will probably be found between February and April.

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**Tidal stream.**—The influence of the tides is felt about 30 miles up the river; *see* p. 24. The water is fresh down to the bar with the ebb tide, and in the rainy season it is fresh at the surface outside.

In the rainy season the river frequently overflows its banks at springs, but the waters do not remain up more than three or four days at a time. The huts on the banks of the river are built on piles, and at these times the only communication between them is by canoes.

**MUSELO MOUTH**, about 10 miles eastward of the East Luabo, and between it and the Chinde, has some sandy cliffs on its north-east side, which may assist in identifying it; about 10 miles from its mouth it joins the East Luabo. The bar is situated about 4 miles off-shore, and when last examined, some 30 years ago, was stated to be impracticable for boats even in ordinary weather, there being a heavy surf on the only spot where a channel appeared practicable. Inside the bar the depths varied from  $1\frac{1}{2}$  to 5 fathoms, to its junction with the East Luabo. Information is wanted on this mouth.

**CHINDE MOUTH\*** is situated about 15 miles north-eastward of the Muselo entrance; this branch is about 20 miles in length, between Foot point, its south point of entrance, and Chinde village near its junction with the main channel of the Zambesi. Foot or Liberal point is low, swampy, and covered with trees about 50 feet high. It swarms with mosquitos and sand flies.

Mitaone, its north point (outer beacon), is in lat.  $18^{\circ} 33' 44''$  S., long.  $36^{\circ} 30' 25''$  E.

Its entrance lies between sand banks and breakers extending about 2 miles seaward of Mitaone and Foot points, and has a bar three-quarters of a mile in breadth, situated  $1\frac{1}{2}$  miles from Mitaone point. This bar (in July and September 1890) had a least depth of 7 feet at low water springs, affording a depth of 14 feet at high water neaps and 19 feet at high water springs, but the depths and direction of the best water are constantly shifting, and therefore not to be depended on. The bar should be examined before entering.†

Within the bar the depths increase to 3 and 4 fathoms at low water within Mitaone and Foot points; abreast Foot point the river is at least half a mile wide, gradually reduced to about 4 cables abreast Maria point, the west end of Mitaone island, 3 miles above, where it

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\* *See* Admiralty plan of river Chinde, with view, No. 1421; scale,  $m = \text{one inch}$ . Directions by Lieutenant Balfour, H.M.S. *Stork*, 1890; amended from the sketch survey and directions, by Lieut. F. W. Keary, H.M.S. *Redbreast*, September 1890.

† Both in August 1889, the dry season, and in February 1890, the middle of the wet season, the river was barred in two places, each with depths of about 7 feet over them at low water springs, and 19 feet at high water springs. The depth on bar in July 1891 was the same.

is joined by the Maria river, which also leads into the Zambesi. The Inhaombe joins the Chinde about one mile above the Maria. pp. 209-222.

From about 3 miles above the Maria, to one mile above Sombo, or 13 miles above the entrance, the river is about one cable wide, with sufficient depth at all times for vessels that can cross the bar. Above this distance the river is much narrower, and the depths are only from 6 to 8 feet at low water in places. At its junction with the Zambesi, the bar has from 8 to 10 feet at low water.

**Beacons.**—Two pole beacons are erected on Mitaone point, north point of entrance to the Chinde; the outer one, 30 feet high, is surmounted by a white triangle, the inner one, 42 feet high, by a white disc with black centre; these are supposed to be altered to meet any change in the direction of the bars.

A pole beacon, 18 feet in height, surmounted by a white triangle, is erected on Foot point, south side of entrance; these beacons, being small, are not distinguishable until the bar is approached, and are not to be depended on.

**Pilot.**—The services of a native pilot can generally be obtained, but too much reliance must not be placed in him.

**Directions.—Anchorage.**—The land in the neighbourhood of the Chinde mouth is low, and similar to that at the other entrances to the Zambesi, but on a near approach, about 5 miles, the palms with Mitaone point\* will probably be made out, and also the somewhat conspicuous sand hills, 57 feet high, on the north side of Inhamhona river,  $2\frac{1}{2}$  miles north-eastward of the Chinde; soon after the beacons on the entrance points should be made out. See sketch on plan.

Having identified the entrance, steer in with the tallest of the palms, bearing about N.W., by N. anchoring in not less than 5 fathoms, about 3 miles off the entrance points. From this position, on a first visit, a boat should be sent in to sound on the line of the leading beacons, and to ascertain the best water over the bars; the best time to enter is from three-quarter flood to high water.

In July and September 1890, the mark for crossing the bar was the inner beacon open westward of the outer beacon, bearing about N. by W.  $\frac{1}{2}$  W., until Foot point beacon bore W. by N.  $\frac{1}{2}$  N. The beacons were then brought in line to pass eastward of the  $1\frac{1}{2}$  fathom spit extending from its southern bank, probably the remains of the former inner bar.

When Foot point beacon bore West, or the western palm in line

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\* These palms were seen 12 miles on a clear day.

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with the first point eastward of it, N.W.  $\frac{1}{3}$  W., (which latter mark led northward of the shoals extending from Foot point,) course was altered to pass about  $1\frac{1}{2}$  cables from the northern shore, until abreast the palms, whence the course was W. by S.  $\frac{1}{2}$  S. to the anchorage abreast the settlement. There is good anchorage anywhere between Foot point and Luabo point spit 2 miles above, in depths of  $2\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms, good holding ground. Vessels should moor. Luabo spit extends half a mile westward of the point, nearly to the middle of the river. The south extreme of the island in Maria river, just opening off Maria point, leads westward of it.

It is probable that from about February to April, when the river is in flood, and the water is being discharged from it with considerable strength, that the channel over the bar will be straight, and in the direction of the lower reach of the river, towards the bank extending eastward of Mitaone island; whereas in the dry season, when the stream is weak, the tendency is for the prevailing S.E. wind to heap up sand to seaward, and to force the channel in a more oblique southerly direction.

**To enter the Zambesi from the Chinde.**—There is depth enough at all states of the tide for a vessel to reach Sombo, and one mile beyond; but if proceeding into the Zambesi she should time herself to reach Sombo about an hour or more before high water, as the river above has depths of 6 to 8 feet only in places at low water, and is very narrow. Vessels of about 150 feet in length once committed to the upper part of the Chinde must continue on into the Zambesi, as there is no room to turn. The bar abreast Chinde village has 8 to 10 feet at low water and not less than 14 feet at high water neaps, with the large tree westward of Chinde village bearing S.W. Thence the turn into the Zambesi northward is sharp round the spit extending from the north point, the channel between it and the bank in mid-channel of the Zambesi being only about 30 yards wide. The deep water in the Zambesi is along the eastern bank. The *Redbreast* (September 1890) anchored just above the junction in 4 fathoms, but had to shorten in when swinging to tide.

**Tides.**—It is high water, full and change, approximately, in the Chinde entrance, at 4h. 30m.; springs rise 12 feet, neaps from 6 to 9 feet: off Mitaone point July 1890, the tidal streams set in the direction of the channel, flood W. by N.  $2\frac{1}{2}$  knots; ebb E. by S.  $3\frac{1}{2}$  knots; ebb ran from 6 to 7 hours at springs, and 8 hours at neaps. Occasionally during neaps there was no perceptible flood stream.

Tides in the Zambesi, *see* p. 27.

**Settlements.**—A Portuguese settlement has been made within pp. 209-222.  
Foot point, with barracks, flag staff, look-out house, custom house, &c.; about 40 soldiers, black, under a captain, were here in February 1890. The village of Sombo is situated about 12 miles above Foot point, and the village of Chinde 20 miles above, at the junction with the Zambesi. A few fowls only are obtainable in the Chinde, and possibly game may be shot on Mitaone island.

**Inhamhona river** entrance is just northward of Mitaone point and has apparently a narrow channel at high water. A line of smooth water was observed between the breakers on a calm day.

**INLAND NAVIGATION. — General Remarks.** — The Zambesi is only navigable by steamers of very light draught of water, at all times of the year; at low river anything over 18 inches draught may ground in places. The navigation is blocked by the rapids some 20 miles above Tete, or about 320 miles from the sea. Its most important tributary, the Shiré, is also navigable for the same light draughts to its rapids, about 300 miles from the sea, and about 190 miles above its junction with the Zambesi.

Vessels of about 10 feet draught can probably ascend the Zambesi by the Chinde or Inhamissengo (Kongoni) mouths at all times of the year as far as Mchenga village on the east bank, about 5 miles above the junction of the Chinde with the Zambesi, and 25 miles from the entrances, as stated at p. 18. H.M.S. *Stork*, drawing 11 feet, ascended to Mchenga in July, the dry season, by the Chinde;\* here she was stopped by a bar only passable at high water, but as the river appeared to be still falling, it was not deemed prudent to pass above it. The river was found to afford only just water enough for her loaded boats a few miles above; and many similar bars were met with before reaching Morambala on the Shiré, about 150 miles above the ship.

**General Directions.**—Owing to the constant and rapid changes which occur in the navigable channel of the Zambesi, no permanent directions of any value can be given; islands form and wash away, and channels which have been known to exist at one season, may be found to have disappeared a month later; the navigable channel bears no proportion in the dry season to the width of the river, which varies, below Sena, from a half to over three miles, and is in places studded with islands. The channel crosses and re-crosses

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\* H.M.S. *Redbreast*, drawing 13 feet, ascended to within a short distance of Mchenga in September 1890, but had great difficulty on account of the narrowness of the Chinde and the sharp turns.

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from bank to bank, rendering the distance traversed in many places quite double to that shown by the chart. In these crossings the channel is always shallower than where it takes the direction of the banks, but the worst portions are usually pretty clearly defined. In calm weather there is a peculiar boiling up of its water, and when the wind is blowing up the river, as it usually does, the ripples on the shallows are more marked than in the deeper water, and similar ripples or breakers mark the edge of the shallow bank above. These ripples are almost the sole guide of the pilot.

As a general rule, by keeping on the outer side of the bends of the river, and avoiding the points, most of the shallow places will be avoided, as in all river navigation. At a crossing, keep well up towards the upper sand bank, more especially when descending the river; the vessel may ground on this bank with impunity, as the current will wash her off, but should she ground on the lower bank it means hours lost in laying out anchors and heaving her off. In this case her head must be got up stream as soon as possible.

Snags are plentiful in the Chinde, Zambesi, and Shiré, and are a constant source of anxiety, as each year's flood brings down snags, and to add to the difficulty if they are 2 feet below the surface there is no sign of them. They are more numerous in the Shiré above Chiromo, than below.

**In the rainy season.**—During the greater rains, January to March, it is possible for vessels of about 5 feet draught that can steam 10 knots, to ascend to Tete on the Zambesi, or to Katungas village on the Shiré, each about 300 miles from the sea, but probably not without grounding, as the channel is never two seasons alike. There is the chance of being detained until the next high river should the vessel get aground. *See* remarks on the Shiré at p. 37, and the Zambesi above the Shiré junction, p. 34. In early March the river will be highest, about 20 feet above low river, after which it usually falls rapidly. *See* height of river and rainy season, pp. 29, 30. In addition to the risk of grounding, for the reason given above, vessels have to contend against a current at times of from 4 to 5 knots an hour. In the Lupata gorge, some 60 miles below Tete, it would be stronger during the first rush of the floods, as its rate there is 3 knots in the dry season, but the water is deep.

**In the dry season.**—The general character of the waterway during the dry season, after June, is comparatively deep reaches, separated by shallow bars, the position of and depth on which varies from season to season, depending on the lowness of the river and

the effect of the previous flood. Thus, while at some seasons a vessel of 3 feet may possibly pass, in another 18 inches is none too little. pp. 209-222.

More or less permanent shallow places are found in the Zambesi, even nearly down to its junction with the Chinde, where there may not be more than  $2\frac{1}{2}$  feet, but more particularly between its junction with the Shiré and Tete. From the month of August to early November, for about 15 miles above the junction, and again in a portion between Sena and the Lupata gorge, the river is hardly navigable for anything drawing over one foot. The flats in the Zambesi above the junction of the Shiré are avoided by ascending the Shiré to the Ziu-ziu, a connecting channel between the two rivers, and re-entering the Zambesi by it.

The Shiré also, particularly in the Elephant marsh northward of the Ruo, is shallow, not more than 2 feet at the same period. *See* pp. 37 and 40.

The early part of the dry season, April and May, naturally affords more water in the channels than during the other months, but these are most unhealthy.

**Tides.—Current.**—The tidal rise in the mouths of the Zambesi is about 12 feet at springs; this amount is reduced to about 5 feet at Mchenga, situated about 25 miles above the entrances, and 5 miles above the junction of the Chinde, and the time of high water at that place is  $2\frac{1}{4}$  hours later, or 6h. 50m., full and change; springs rise about 6 feet. At about 5 miles above Mchenga there is no rise of tide, but the effect of the flood tide in checking the stream coming down the river is sensibly felt for many miles above, probably as far as Expedition island. Above this there is a constant down stream, varying from  $3\frac{1}{2}$  knots when the river is in flood, maximum about February and March,\* to  $1\frac{1}{2}$  to 2 knots in the dry season, the minimum probably from end of August to early November.

In the lower Shiré the stream runs from  $\frac{3}{4}$  to  $1\frac{1}{2}$  knots in the dry season; and in the upper Shiré, above the falls, less.

**Pilots.**—The only pilots on the river are natives who have served on the African Lake Company's steamers. The navigation is entirely by the eye. These men require careful watching as they have but little idea of the strength of the stream or the turning capabilities of the vessel.

**Anchorage.**—Vessels or boats seeking temporary anchorage are recommended to anchor usually well out in mid-stream in preference

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\* Livingstone states that at Tete, a few days after the first rush of the floods, the stream returns to its usual rate of  $1\frac{1}{2}$  to 2 knots, *see* p. 29.

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to near the banks ; but in early May a good look out must be kept for the large masses of grass, resembling floating islands, which are brought down by the stream, especially in the lower part of the Shiré, as not only are they liable to trip the anchor, should one foul the cable, but there are often snakes among the grass. At this time anchorage should be sought well under the lee of a bend.

Anchors should be sighted about every 10 days when the river is in flood, otherwise they get buried.

**Tracking** the boats along the river banks is possible for short distances in most places above the Delta during low river.

**Supplies.**—Fowls and game are fairly plentiful ; goats may occasionally be obtained, but fruits and vegetables are scarce. Rupees are well understood by the natives, but white and blue calico, coloured handkerchiefs and beads, are good articles for barter. The stations of the African Lakes Company will probably afford the best supplies. The river water, after being filtered, is always good for drinking.

**Wooding stations.**—On the Shiré wood can be supplied by contract at port Herald, lat. 16° 49' S., the first British settlement on the right bank ; and at Chiromo the naval depôt. Above that wood is cut and sent off as required, when the river is navigable.

The Portuguese keep a supply at Morambala, but it is not always available. British trading steamers have to use their carrying capacity for fuel for the run from port Herald to the Chinde.

**Produce.**—The country is capable of producing large quantities of wheat, maize, cotton, various kinds of vegetables, and oil seeds, &c. Quantities of ivory are brought to the trading stations. The forests of Shupanga and others contain valuable woods, such as rose-wood, ebony, lignum vitæ, &c. About four miles northward of Tete several seams of coal were seen by Livingstone, one of which was 25 feet in thickness ; near Chiceva above the Kebrabasa rapids, coal crops out of the face of the cliffs. During the last few years coal has been discovered in the valley of the Muarese or Mirarazi river, some 7 miles below and northward of Tete. The Delta is well suited for sugar plantations. In the Shiré valley, semsem and ground nuts grow readily, and plantains in abundance ; the soil is also suitable for the growth of sugar cane, and in the Shiré highlands fruit and vegetables grow in profusion. Wheat is also grown in the highlands, but not in any great quantity, but the soil is said to be well suited to the growth of coffee and cinchona.

**Trade.—Communication.**—A great portion of the trade with the Zambesi passes through Kilimán, but since the rivers have been declared free, the direct route from the Chinde mouth must eventually take the greater portion of trade. Goods for the interior by the Kilimán route, are landed at Kilimán, and after being examined by the Customs, are re-shipped in lighters and canoes and conveyed up the Kilimán or Kwa Kwa river to Marendene, or Mopea, a distance of about 80 miles, a journey of 3 to 5 days. In the dry season only the smallest canoes can reach Mopea, consequently the goods are then landed at Marendene. From these places the goods are carried by porters across to the banks of the Zambesi, the distance from Mopea being  $2\frac{3}{4}$  miles to Vicente, the African Lakes Company's station on the banks, and from Marendene apparently about 6 miles. When the river is in high flood, the Kwa Kwa is connected with the Zambesi at Mazaro by a natural canal, affording a passage for canoes, as stated at p. 33. From thence the goods are carried by river steamers or canoes to the chief places of trade. The Barabanda, some miles above Mazaro, also connects the Kwa Kwa with the Zambesi during high flood.

**Telegraph.**—Mopea, the Portuguese station near the Zambesi, at the head of Kilimán river, Sena on the Zambesi, Pinda and Chirom on the Shiré, and Sombo (Chinde river), are connected with Kilimán by telegraph. The interruptions on the line are frequent, as the wires are taken from tree to tree where available, and the trees are often blown down, and the posts broken.

**Natives.**—The natives near the banks of the Zambesi are usually friendly and ready to trade, but opposite Tete the country away from the banks of the river is in a very insecure state.

**Height of river.**—The first rise in the Zambesi, after low river, begins with the lesser rains in November (*see* rainy season, p. 30); it attains its maximum about the end of December or the beginning of January;  $13\frac{1}{2}$  feet (the maximum) was registered at Tete on 17th January 1889. The river then falls a few feet, until succeeded by the great rise, which takes place after the river has inundated the interior to a similar manner to the overflow of the Nile, and is at its highest at Tete in March, amounting usually to about 20 feet above low river, but every fourth year (the natives state) it rises about 30 feet. The rise is sudden, and the water is highly discoloured and impure, but still good for drinking purposes, and the current runs down at the rate of 4 to 5 knots, but in a very few days after the first rush, the current resumes its usual rate at Tete, from about  $1\frac{1}{2}$  to 2 knots. The

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Zambesi water at other times is almost chemically pure. In the Shiré, off the mouth of the Ruo, 6th January 1862, the river had only risen  $4\frac{1}{2}$  feet above its level in the preceding June,  $1\frac{1}{2}$  feet of which occurred on that day, but the November rains had only lasted 6 days. The *Pioneer*, drawing  $5\frac{1}{2}$  feet, was detained here 5 weeks to 7th January, through the water not rising sufficiently to allow her to pass down over the flats near the Elephant marsh.

The dry season of 1890 was marked by what was thought to be an exceptionally low river, but the flats in the Zambesi were passed by vessels of 2 feet 4 inches draught, and the Shiré presented no real difficulty to navigation. The following season of 1891 however was much worse; it was only with great difficulty H.M. gunboats, drawing 2 feet 4 inches, reached port Herald at the end of October; here everything was landed, and the vessels drawing only 2 feet, had to be hauled over the flats by warps to reach Chiromo. Nor was this all, the Shiré below Pinda was quite unnavigable, and the channel known as the Leak, was a rushing torrent. A narrow channel called Mjassa with 4 feet water, was discovered, joining the Ziu Ziu; this channel enabled the vessels to join the Shiré again near Pinda.

In February 1891 at Katungas the river was falling one inch daily from 18th February for about 3 weeks, but the Zambesi and Lower Shiré were flooded on 17th March. The Zambesi was still high on May 12th but water was falling. (Lieut. Lyons, H.M.S. *Herald*.)

**Rainy season. — Rainfall.** — The valley of the Zambesi is reached by the lesser rains late in October, when the sun is passing southward; these diminish or cease altogether in December, when at times there is a partial drought. The heavy rains usually begin when the sun, returning northward, is in the zenith, about the middle of January, and continue till the end of March, or the beginning of April. The remainder of the year is dry.

The rainfall near Tete is from 33 to 36 inches, though as little as 19 inches was registered in one year. In the Shiré highlands it amounts to 50 inches; and at Bandawé, the head station of the Free Church of Scotland, on west shore of Nyassa, it is about 85 inches.

**Winds.** — The wind blows from the southward, up river, nearly all the year round in the day time. See Winds off the coast, p. 48.

**Climate.\*** — April and May are probably the most unhealthy months in the Zambesi and Shiré, when the rains having ceased, the action of the sun on the decaying vegetation is most active, producing deadly

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\* The Chinde was healthy and free from fevers and mosquitos in September—October, 1890; maximum temperature  $75^{\circ}$ , minimum  $68^{\circ}$ . Lieut. Keary, H.M.S. *Herald*.

exhalations. February and March, the height of the rains, and November, the period of greatest heat, are also very unhealthy. The Delta of the Zambesi and the lower valley of the Shiré, particularly in the neighbourhood of the Morambala and Elephant marshes, bear the worst character, and the mosquitos are a terrible plague. The upper valley of the Shiré, above the falls, and lake Nyassa are less unhealthy, but the climate is always trying to Europeans. In the Shiré highlands, from 3,000 to 5,000 feet above the sea, where are the chief mission stations of the Established Church of Scotland, the climate is healthy and well suited to Europeans; it is used as a sanatorium for those requiring a change from the mission stations on the shores of Nyassa. Below the level of 3,000 feet, the climate deteriorates.

The report from H.M.S. *Herald* 1891, on the health of the several places is as follow :—Katungas, a very unhealthy locality. Chiromo, very fair. Vicente, severe attacks of malarial fever at all seasons. Chinde river, no marked unhealthiness, but chills are dangerous.

**Temperature.**—At Tete, on the Zambesi, the greatest heat is in February, 103° being registered in the shade; it is coldest in July, about 72°, and in November it is about 84°. Between Tete and the coast, in February the temperature is about 98° at noon, and 80° at night. On the Shiré, below the Murchison falls, in September it is about 100° in the shade. At Blantyre, in the highlands, the average temperature is 50°, on several occasions it has fallen below 40°, and once it was registered 30° (July). At Bandawé, west shore of Nyassa, the max. is 85° (November), min. 60° (May); the extremes are 100° and 54°.

**Personal care of health.**—Flannel should be worn next the skin by day and night; if other clothes are worn during the day the change to flannel should be made before sunset, as there is a considerable lowering of the temperature during the night, especially about July, the coldest time of the year.

The head and spine should be effectively protected; the former, preferably by a well ventilated pith hat; the spine should be protected by an extra thickness of flannel down the back of the shirt; flannel waist belts are recommended.

Sleeping in draughts, opposite a windsail or open port, should be avoided, or a chill may result, followed perhaps by fever. As a rule, sleeping on deck is not recommended, but if indulged in, the whole body should be well covered up, and exposure to dew especially avoided. Damp clothes should be removed as soon as possible.

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In malarious regions, mosquito curtains are a great protection, beside acting as a protection against noxious insects, and they minimise the danger of exposing the body during sleep; moreover, sleep is scarcely possible in some portions of the river, more especially near the swamps in the Shiré, without such protection.

The three or four hours before sunrise are those in which precautions are most needed on account of the liability to chills; everyone should be under cover at that time. It is just then, when temperature has reached its minimum, that sleep is most refreshing.

Excess in eating and drinking should be avoided; all meat should be well cooked, the drinking water filtered before use. The river water both in the Zambesi and Shiré is perfectly good; the water, when the rivers are in flood, is turbid, and if left to stand throws down a certain amount of deposit, but it is always good when filtered. Water from wells should be avoided, but if used should be boiled. The practice of freely yielding to the sensation of thirst is to be deprecated, as leading to excessive perspiration, which saturates the clothing and predisposes to chill.

Extreme moderation in the use of spirituous liquors is earnestly recommended. Active employment is necessary for everyone employed in malarious rivers, as fever almost invariably attacks first those who lead a sedentary life.

Quinine, in two-grain doses, three or four times in the twenty-four hours, in notoriously malarious districts, is recommended.

These are the most effective measures against fever.

Sir John Kirk remarks, "The best rule for health for men employed afloat in the Zambesi, is to go to bed early, avoid chills at night, have a cup of hot tea, coffee, or cocoa in the morning before exposing themselves on duty on deck in the cold morning mists which chill you to the bone, and on no account permit spirits to be drunk in the middle of the day. Sunset is the time for the men's allowance. Remember that mosquitos are in millions on the Shiré. I would always anchor in the stream clear of the shore."

**Aspect of river.—Settlements.\***—The banks of the various mouths of the Zambesi for the first 10 or 15 miles are of much the same character, being low and thickly covered with trees, the greater portion of which are mangrove jungle. At about the junction of the Inhamissengo with the main stream the pandanus or screw palm trees begin, many so tall as to resemble steeples; guava and lime

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\* Approximate distances from the sea of the most important places will be found on page 42.

trees are also abundant, many huts peep out between the bananas and cocoa-palms on the west bank, standing on piles a few feet above the ground, as considerable portions of the land in the rainy season towards spring tides are overflowed for three or four days at a time. The soil is wonderfully rich, and rice and many kinds of vegetables are grown in abundance; the whole of the region between the junction of the Inhamissengo, and Mazaro, some 60 miles in length by 50 miles in breadth, is very fertile and well adapted to the growth of sugar-cane. pp. 209-222.

**Chinde and Mchenga villages.**—On the east bank, at the junction of the Chinde, are the villages of Chinde and Maruga, one mile apart; 5 miles above the latter is Mchenga village.

Above the junction of the Chinde, the western bank abounds in cocoa-nut palms, and is somewhat higher than the eastern one, which is sandy; the banks of the river continue mostly of sand, with but few trees, until within about 20 miles of Maruro, and it is possible to track boats in most places.

**Nyangombi**, on the east bank, is a large plantation, some 20 miles below Maruro, in about lat.  $18^{\circ} 21' S.$ ; it was a large plantation when visited by Commander Hyde Parker in October 1849, in the boats of H.M.S. *Pantaloön*.

**Mazaro**, meaning the mouth of creek, and about 80 miles from the sea, in lat. about  $18^{\circ} 4' S.$ , is situated at the mouth of the creek (Mutu), which, during high river, about February or March, admits of the passage of boats from the Zambesi to the Kwa Kwa or Kilimán river; during the dry season the bottom of this creek or canal, about 30 yards wide, is about 16 or 17 feet above the level of the Zambesi.

Here the Zambesi is about half a mile wide, and the view is a magnificent one; the river is studded with islands, the sides of which are clothed with grass and shrubs, with many a creeper and convolvulus. On the opposite banks is the Shupanga country, well wooded, and the home of the monster baobabs, many of enormous thickness.

At Maruro, situated just below Mazaro, the bank of the river has washed away considerably of late years; in 1884 a house was washed away by the encroachment of the river, which, in 1882, was 800 yards from the bank. Mopea is considerably nearer the river than formerly, and it is believed that the time is not far distant when it will be on the banks of the Zambesi.

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**The wind** usually blows up the river, particularly from May to November.

**Vicente, Mopea, Marendene.**—Vicente, the first station of the African Lakes Company, is about 4 miles above Mazaro, on the east bank of the river, about 65 miles above Chinde, and 85 miles from the sea ; here are warehouses for the storage of the company's goods.

Mopea is situated  $2\frac{3}{4}$  miles eastward of Vicente, on the Kwa Kwa or Kilimán river, about 80 miles above Kilimán town, and is in connection with it by telegraph. In the dry season there is just enough water at Mopea for the smallest canoes ; at this time the goods brought up from Kilimán in lighters and canoes have to be unloaded at Marendene, a few miles below Mopea, where there is deeper water in the river, thence conveyed by porters to the banks of Zambesi, a distance of about 6 miles, either to Vicente or to Mazaro, whence the goods are distributed by river steamers or canoes to the trading stations up river. The transport from Kilimán to the Zambesi occupies from 3 to 5 days.

**Shupanga** is situated about 5 miles above Vicente, on the opposite bank of the Zambesi. In the forests at Shupanga the Mokunda-Kunda tree is found ; it makes good boats' masts, and yields a strong, bitter medicine for fever ; the Gunda trees here attain an immense size ; its timber is hard, and the large canoes used on the Zambesi and Kwa Kwa, capable of carrying 3 to 4 tons, are made of its wood. India rubber, calumba root, and indigo are plentiful in the district. Wood for fuel is collected here for the use of the African Lakes Company's steamers ; the African ebony and lignum vitæ ; the latter of which sometimes four feet in diameter, are the most suitable. At Shupanga lie the remains of Kirkpatrick, of Owen's surveying expedition of 1826, and of Mrs. Livingstone, who died here in 1862. The immense baobab that formerly shaded the graves has now fallen. Some 5 miles inland are the Shupanga hills, from 300 to 400 feet in height. The country abounds with game. For about 2 miles above Shupanga, the west bank is rocky and steep, with a few rocks at a short distance from it. Above this both banks are about the same height as below, and are about 20 feet above the river in July.

**Depths in the Zambesi above the junction of the Shiré.**—Between Shupanga and Sena, the river is exceedingly interesting and picturesque ; it is also considerably wider than below, and studded with islands, dividing the river into several channels, all of

which are shallow. (Livingstone's steam-launch was constantly aground here when going up in August). pp. 209-222.

That portion of the river between the mouth of the Shiré and 15 miles above, is only available for light boats in the latter part of the dry season ; the best route then is to proceed up the Shiré a short distance, to the Ziu Ziu, thence by that stream back to the Zambesi and up to Sena ; the Ziu Ziu is reported to be free from sand banks.

The Zambesi is also very shallow in places between the Ziu Ziu and Tete, the river being 3 miles wide in places, consequently the water is spread over a great width of sand bed, with reedy islands between the channels ; from September to early November, one portion of the river between Sena and Lupata is hardly navigable to anything drawing over one foot.

**Shimoara** is situated on the east bank, just below the junction of the Shiré ; its quartz hills are covered with trees and gigantic grasses, affording wood for fuel.

**Sena**, one of the principal Portuguese stations, is situated on a low plain on the west bank of the Zambesi, with some pretty detached hills in the background ; it contains a few large houses, and is surrounded by a stockade of living trees. A mound shows the site of an ancient monastery, and there is a dilapidated mud fort near the banks of the river. Dr. Livingstone (in August) remarks : " Being unable to take the launch up the shoal channel on which Sena stands, we anchored at Myaruka, 6 miles below, and walked up "

A picturesque range of lofty hills commences on the left bank, opposite Sena, trending in a northerly direction parallel to the river. About 200 miles south-westward of Sena are the gold mines of Manica, worked in olden times, but now apparently abandoned. Telegraph, p. 29.

**Pita island**.—Dr. Livingstone remarks—" Some miles above Sena is Pita island, with a considerable native population, which appeared to be well off for food. The heat of the weather increases during this month (August), foggy mornings are now rare ; a breeze, which gradually freshens, blows up the river every night ; it began in the afternoon a few weeks ago, then later, and at present its arrival is near midnight ; it makes our frail cabin doors fly open before it, but continues only for a short time, and is succeeded by a dead calm. Game becomes more abundant as we proceed up ; near our wooding places are herds of zebras, water bucks and wild hogs, with the spoor of buffaloes and elephants."

**Shigogo**.—**Lupata gorge**.—The portion of the river named Shigogo and Shipanga, is bordered by a low level expanse of

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marshy country, with occasional clumps of palms and a few thorny acacias. The river spreads itself out to 3 or 4 miles in width, with many islands, among which it is difficult to navigate, except when the river is in flood. Above, a range of hills from the north-eastward crosses, and compresses the river into a deep narrow channel named the Lupata gorge, through which the current ran at the rate of 3 knots (in August), but the water was deep, and the *Ma Robert* steam launch got through with ease. A strong current sweeps round the little rocky promontories of Chifura and Kangomba, forming whirlpools and eddies dangerous for the clumsy native craft which are tracked past with long ropes; heavy laden canoes take two days to track through the gorge. The Portuguese gunboats are warped through the gorge. The currents above the gorge are stronger than those below, probably running about 2 knots at this season, that below being assumed to be about  $1\frac{1}{2}$  knots.

Above the Lupata gorge, on the east bank, and about 7 miles below Tete, is the Muarese or Mirarazi stream; coal has been found in the valley through which it discharges into the Zambesi. The country inland here is very insecure.

**Tete** or **Nyungwe** stands on a succession of sandstone ridges on the right bank of the Zambesi, which is here 960 yards wide. Shallow ravines, running parallel with the river, form the streets, the houses being built on the ridges. A wall of stone and mud surrounds the village, and the native population live in huts outside; the fort and the church near the river are the strongholds. Droughts are of frequent occurrence at Tete, and the crops suffer severely.

The mango tree grows luxuriantly in this portion of the river, and furnishes a grateful shade, and the fruit is plentiful between November and March.

The country between Tete and Panda Mokuia, where the navigation ends, is well wooded and hilly on both banks of the river. Panda Mokuia is a hill 2 miles below the rapids, capped with dolomite containing copper ore.

**Rapids.**—Above Panda Mokuia are the Kebrabasa or Chinaronga rapids. The lower one of these, named Morambawa rapid, when seen in November (low river), had a fall of 20 feet in a distance of 30 yards. During high river these rapids are said to disappear, and the river is then half a mile wide, but at low river the rapid rushes through a gorge only from 40 to 60 yards wide. These rapids extend nearly to Chiceva, a distance of about 40 miles; in descending one of these

Dr. Kirk nearly lost his life. During high river these are said to be smoothed over. pp. 209-222.

**Navigation above the rapids.**—The river is therefore impassable for 40 miles, implying a portage to that extent; above Chiceva the river becomes navigable, and remains so with only one or two rapids that are not of a nature to stop navigation until within 30 or 40 miles of the Victoria falls. This upper reach is more navigable than the portion between Sena and Tete, and can be made use of by a vessel of 2 to  $2\frac{1}{2}$  feet draught. There are two rapids that would require a little study, but with these two exceptions the river is safe.

**Victoria falls** are separated by an island into two portions, the whole measuring about one mile in width. The river thus divided drops into a deep chasm from a height of 350 feet, causing a vapour to ascend, which has caused it to be named by the natives the Mosi-ao-tanya, or smoke sounding. The streams rush towards one another in the chasm, producing a fearful boiling whirlpool, thence rushes through a zigzag gorge, apparently not more than 20 or 30 yards wide, situated at right angles to the fissure of the falls, beyond which it expands into the upper reach of the Zambesi, but is not navigable for some 30 or 40 miles below, as before mentioned.

**The SHIRÉ.\*—General remarks.**—The Shiré enters the Zambesi about 110 miles above its mouth, in about lat.  $17^{\circ} 43' S.$ , long.  $35^{\circ} 24' E.$  Its entrance cannot be mistaken on account of the sharp angle it makes with the Zambesi; moreover, in the dry season, it is impossible to proceed beyond the junction, as the flats in the Zambesi reappear, and if bound to Sena the passage lies through the Ziu Ziu.

The Shiré is navigable for short and handy vessels of about 5 feet draught from about March to early June, high river; the water is falling from about the middle of May. Vessels of 2 feet draught only, can be depended on to pass up the Shiré during the months of September, October and November, and possibly in February (when the river has fallen after the smaller rains), if the greater rains have not commenced. There are flats at the latter time below port Herald, lat.  $16^{\circ} 49' S.$ , and also between that port and Chiromo, with only about 2 feet over them. The ascent to Katungas can only be made when there is an assured rise of 2 feet there, for, should a vessel get caught above the flats with a falling river, she possibly might not get

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\* Information on the Shiré, amended from the remarks of Lieutenant H. J. Keane, H.M.S. *Herald*, and Lieutenant A. H. Lyons, H.M.S. *Mosquito*, 1891-2.

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down again before the next rains. The Zambesi and Lower Shiré were in flood from middle of March to middle of May 1891, when the water began to fall.

**The mouth** of the river is rocky and somewhat dangerous, but for about nine months of the year the main channel can be avoided, by using a channel about 30 yards wide between an island and the west bank which is almost free from danger. During very low river the main channel must be used, avoiding its east side, and giving also the east point, on which the whale-back trees are, a good berth before turning up for the entrance. A rock in mid-river was dry about  $2\frac{1}{2}$  feet at low river, 1890; (the channel is apparently between it and the island before mentioned.)

**Dangers.**—Two other places in the Shiré also present difficulties to its navigation, namely, the Leak, and Pinda rapid. The former is about 16 miles above Morambala, the Portuguese wooding station, and one mile above the Ziu Ziu with which it connects. It is about 80 feet wide here, and at right angles to the Shiré; in the dry season the water runs through it with considerable velocity, and the channel of the Shiré being very narrow, and running close to the Leak there is considerable danger of being sucked down this narrow rapid, and both anchors should be ready.

**The Pinda rapid** is about half a mile above the Leak; the danger here is caused by a sharp turn, and a swift current caused by the channel being narrowed by a small rocky island. The west channel is the navigable one, keeping near the river bank. The Portuguese telegraph wires lead directly over the island, and seemingly there will be but little space for the funnels of steamers at high river.

The dangers enumerated cause but little anxiety going up, the danger lies in not hitting them off successfully going down stream.

Pinda being passed, there is a clear run through the Morambala marsh to Shuonga; the river is tortuous, but there is plenty of water.

**Morambala mountain.**\*—The Shiré is interesting and picturesque as far up as Morambala, above which it becomes wearisome on account of the low banks and monotonous windings of

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\* In the dry season of 1875, when Mr. Young placed the mission steamer *Ilala* on lake Nyassa, he found the Shiré, abreast the upper end of Morambala mountain, so blocked, that no channel could be found without native assistance, and eventually a passage had to be cut through the grass into the river above. H.M. gunboats in the dry season of 1891, had a similar experience; the river below Pinda was blocked; they were successful in finding a narrow stream which led into the Ziu Ziu and out near Pinda above the obstruction. See height of river, pp. 29, 30.

the stream, which almost double the distance; the marshes westward of Morambala, and the Elephant marsh, which begins from abreast the Rhuo, are about the worst and most unhealthy parts, and in these no wood for fuel is obtainable. Above Elephant marsh there is plenty of wood.

Morambala mountain, meaning the lofty watch tower, is about 4,000 feet in height, 7 miles in length, and situated on the east bank of the Shiré, about 35 miles within its mouth; it is visible down the Zambesi at Mazaro, and is a striking object. The summit of Morambala, though nearly always enveloped in mist, is far more healthy than the lower Shiré valley. There is a Portuguese wooding station at Morambala station on the bank of the river.

**At Shuonga** or Chiwanga, a notice board was erected in July 1891, in lat.  $17^{\circ} 5\frac{1}{2}'$  S., long.  $38^{\circ} 18\frac{1}{2}'$  E., and all the territory to the northward on the right bank, proclaimed as British Territory. Two conspicuous palms, rising from a small clump form a conspicuous object, one mile north of the notice board. The Ruu river, above, is the boundary on the left bank. There is a flat immediately above Shuonga.

**S bends.**—At the head of the Morambala marsh are the S bends, so called from the succession of very sharp and narrow bends in the river; the water is deep, but when the river is in flood the stream is strong, rendering extra care necessary when descending the river.

Above these bends, the river widens and the curves are less sharp; signs of cultivation which have been absent in the marsh again appear, and the country on the right bank wooded.

Two shallow flats (only 2 feet over them in the dry season of 1890) have to be passed before reaching port Herald.

**Port Herald** or Juan Makanga, the first British settlement on the right bank, is a fairly large village, and situated in lat.  $16^{\circ} 49'$  S. Wood can be supplied by contract here. The run up from Morambala can be made in about 12 hours, so there is no necessity to anchor in the Morambala marsh.

**Chiromo.**—Above port Herald the river loses much of its previous monotonous character; numerous islets are dotted about, and trees with heavy creepers overhang the water; on either hand are ranges of hills, and the lofty summit of Chipirone commands attention. The channel, however, is very shallow; in September 1891, the river steamers drawing 2 feet 4 inches had some difficulty in descending; and in October, H.M. gunboats lightened to 2 feet had to be constantly assisted across the flats with warps.

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Chiromo or Chilomo on the north side of the mouth of the Ruo is a naval depôt, and a wooding station of the African Lakes Company.

**Ruo river** is a tributary of the Shiré, and separates British from Portuguese territory. On the south point of its entrance rests the remains of Bishop Mackenzie, who died here in 1862 from fever caught by severe exposure in the wet season ; the grave is marked by a large iron cross, erected by Mr. Young. The Ruo is 100 yards wide and navigable for canoes for about 12 miles, where the rapids begin.

**Katungas.**—Above Chiromo the river passes through the Elephant marsh and continues shallow ; as before stated, vessels of 2 feet draught can only ascend to Katungas on an assured rise of 2 feet at that place, and may have to wait an indefinite period for another rise which may not come until the next wet season. In 1890, the water at Katungas, after the lesser rains fell about an inch daily from 18th February, rendering it necessary for the *Herald* and *Mosquito* to descend to Chiromo, which they did on 11th March. On 17th March, the Zambesi and Lower Shiré began to rise again. On the 15th June the water was still high in the Elephant marsh, and the current was sluggish, being still banked up by the water in the Zambesi. Elephant marsh, which begins from abreast the Ruo, are about the worst and most unhealthy parts, and in these no wood for fuel is obtainable. Above Elephant marsh there is plenty of wood.

**Mulilima (Chibisas)\*** village, a few miles above Katungas, on the opposite bank, is situated about 10 miles below the Murchison rapids ; the *Pioneer* spent a season here, whilst Livingstone was visiting the Nyassa and Shirwa lakes. At a sharp bend above Chibisas, the channel is barred by rocks during low river ; Matiti village is at the foot of the rapids, on the western bank ; Ramakukans village is nearly abreast of it.

**Murchison rapids or falls** begin in lat. 15° 55' S. ; there are four principal and five minor cataracts, extending over a distance of 40 miles of the river in a north and south direction, to near Matope before mentioned, whence the river, though shallow, is navigable

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\* The *Pioneer*, drawing 5½ feet, with Dr. Livingstone, has been up to Chibisas village, about 10 miles below the Murchison falls, but in November, when she wanted to come down, the water did not rise enough to permit her to pass the flats situated just above the Elephant marsh, above the mouth of the Ruo, and she had to wait until the great rise began, which, in that year, was 19th January, on which day the river rose about 2 feet. The *Ilala*, drawing 4 feet, had also to lighten to pass the same flats, and also at other places (in the dry season of 1875).

to lake Nyassa. (The level of lake Nyassa fell 3 feet between the years 1875–80, reducing the depth in the upper Shiré by the same amount, and causing some anxiety. It is probably due to the rainfall being smaller for those years. The present height of the water is not known.) The lower cataract, named Mamvira, falls 800 feet in about 100 yards, and the level of the land below it is about 1,200 feet below that and the upper cataract, and which is nearly 1,500 feet above sea level. pp. 209–222.

**Settlements.—African Lake Company's stations.**—The African Lakes Company have trading stations at port Chinde; at Vicente; at Chiromo (Chilomo), near the mouth of the Ruo; at Juan Makanga (port Herald); at Katungas, the head village of a Makololo chief of that name, from whence there is a road, *viâ* Blantyre, about 60 miles in length to Matope, in about lat 15° 24' S., above the Murchison rapids, one of the Company's stations on the upper Shiré.

**Shiré highlands.—Blantyre.**—In the Shiré highlands is Blantyre, the head mission station of the Established Church of Scotland; it is situated in lat. 15° 47' S., long. about 35° 4' E., 3,000 feet above the sea, and 28 miles by the road from Katungas on the Shiré. It takes about a fortnight to reach Blantyre from Kilimán, *viâ* the Kwa Kwa to Mopea by boat, and the Zambesi and Shiré by boat.

In the highlands around Blantyre are several sub-mission stations, at Zomba, and elsewhere; the African Lakes Company have established a station at Mandala, close westward of Blantyre, for the development of commerce and agriculture. Buchanan Brothers are growing coffee for exportation and local consumption. Some portions of the highlands attain a height of 5,000 feet above the sea, and the climate on the whole is healthier, and more suitable for Europeans. The average temperature is 50°, the minimum about 40°, but it has been known to fall to 30°. Fruit and vegetables are grown in profusion, and the highlands are used as a sanatorium by those at the Mission stations in Nyassa, who require a change. Morambala mountain is also suitable for a sanatorium.

**The British Commissioner** resides at Zomba, 35 miles north-west from Blantyre, 5 days from Chiromo by native runners; there are no roads, only native tracks.

**Lake Nyassa missions.**—The head-quarters of the Free Church of Scotland Mission, originally established at Livingstonia in 1875,

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near cape Maclear, at the south end of the lake, and near the upper Shiré, have been transferred to Bandawe, about the middle of the west shore of the lake; Livingstonia is now a sub-station, and it is also a station of the African Lakes Company.

The head-quarters of the Universities Mission is at Likoma, an island situated about half way up lake Nyassa, on the eastern shore.

**British steamers on the Zambesi and Nyassa.**—The African Lakes Company have two steamers on the Zambesi, namely, the *James Stevenson*, 90 feet in length, 3 feet draught, a stern wheeler; and the *Lady Nyassa*, a smaller paddle-wheel vessel; also one on Nyassa, the *Domira*, 80 feet in length, with  $4\frac{1}{2}$  feet draught. On the Nyassa, also, are the *Ilala*, 50 feet in length and 4 feet draught, belonging to the Free Church of Scotland Mission, and the *Charles Janson*, 65 feet in length, draught 5 feet, capable of carrying 20 tons, belonging to the Universities Mission; the latter were taken up the road from Katungas, *viâ* Blantyre, to Matope, in pieces, and there put together. The *Ilala* was in pieces not over 55 lbs., except the boiler of 4 cwt. The *Good News* steamer, now on Tanganyika, was taken this way, thence from lake Nyassa, by the Stevenson road, to that lake.

H.M. gun vessels *Herald* and *Mosquito*, stern wheel steamers, with a load draught of 2 feet 6 inches are employed on the Shiré. They however can lighten to 2 feet.

The distances from the sea are very approximately as follows; the windings of the stream and the toiling against the current make the distances appear much greater than they really are:—

Mazaro (junction with Kilimán at high	
river only) ... ..	80 miles.
Vicente and Mopea ... ..	85 „
Shupanga ... ..	90 „
Junction of the Shiré ... ..	110 „
Katungas village (Blantyre 28 miles beyond,	
by the road) ... ..	290 „
Murchison rapids on the Shiré ... ..	300 „
Sena on the Zambesi ... ..	140 „
Lupata gorge ... ..	340 „
Tete ... ..	300 „
Kebrabasa rapids ... ..	320 „
Zumbo, mouth of Loangwa ... ..	550 „
Victoria falls ... ..	1,000 „

**COAST.**—From the Chinde mouth of the Zambesi the coast trends north-eastward about 40 miles to Kilimán river, in which space there are several streams, some of which connect with the Zambesi. This coast is very low, being scarcely ever seen from the deck in 10 fathoms water; it is a little higher about 8 or 10 miles south-west of Linde river, and again at Linde river, at which place it shows in clumps of trees. A little to the southward of this river there are some sand cliffs separated from the beach by a long lagoon: these cliffs are conspicuous with the morning sun shining on them. The current along this coast is generally S.W. one knot an hour.

Close eastward of the Chinde, and separated from it by Mitaone island, is the mouth of the Inhamhona (before mentioned, p. 23), and farther northward are the Inhamiara and Inhaombe, which also connect with the Zambesi, but we have no information on them.

The general soundings along this part of the coast are 4 fathoms at low water at 3 miles from the shore, and from 6 to 9 fathoms at 5 or 6 miles from the shore, except off the entrance of the rivers.

**Linde (Indian) river.**—The mouth of this river lies about 30 miles south-west from that of Kilimán is about  $18^{\circ} 13' S$ . We have no information on the bar other than shown on the chart, which gives a depth of one fathom on it at nearly 4 miles off shore. There is a large estuary within the bar, with several islands. It possibly connects with the Zambesi.\*

The main branch was explored for 30 miles, with variable depths to that distance. The brig *Singapore*, in 1822, ascended the river about 16 miles, and the least water obtained was 2 fathoms. The Olinda, a stream on the north side of the estuary apparently, was examined by the boats of H.M.S. *Grecian* for a distance of 12 miles; the depths ranged from 10 to 5 fathoms.

Linde river may possibly be known by a remarkable clump of trees about  $1\frac{1}{2}$  miles to the northward of it, which, when bearing to the westward of North, formerly assumed the form of a camel. For a short distance on each side of the entrance of the river there are no tall trees. The entrance of the river shows well on a N.W. by W. bearing.

**The coast** between Linde river and Kilimán is quite destitute of trees, but there are several low sand hills and reddish looking patches, and about  $2\frac{1}{2}$  miles north-east of Linde river there is a low but remarkable bluff. The soundings off this coast decreased regularly.

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\* See Admiralty chart:—River Zambesi to Mozambique harbour. No. 1810; scale,  $m = 0.1$  of an inch.

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**KILIMÁN (Quillimane) RIVER** lies between Tangalane and Olinda (Hippopotamus) points, one mile apart; there is a depth of 21 feet on the bar at high water spring tides, which depth, and more, may be carried to the town. The land on both sides of the entrance is low, sandy, and covered with trees or jungle, the south-west side being rather the higher. The black light structure, and the flagstaff and beacon on Tangalane point, are visible some time before the land, which may be safely skirted at a distance of 5 or 6 miles, the outline of the coast being then clearly distinguishable, but as the current is strong and uncertain in the neighbourhood, caution is necessary. The entrance of the river is conspicuous when open on a N.N.W. bearing, the river being wide and nearly straight for 10 or 12 miles; when abreast of it no land will be visible from the deck between the points of entrance; but from aloft, Pequena island, which is about 4 miles inside the entrance, will be seen.\*

**LIGHT.**—From a lantern on Tangalane point flagstaff, is exhibited a *fixed white* light, visible in clear weather from a distance of 8 miles. A lighthouse is being built near it.

**Signals.**—The light keeper has the international code of signals, but his interpretation of the signals cannot be depended on. If a message is required to be sent, it is better to land and see him, when it will be forwarded by telegraph to the town.

**Outer anchorage.**—Should it be desirable to anchor outside the bar, a good position is in 5 fathoms, with the lighthouse bearing N.  $\frac{1}{2}$  E., distant 5 miles; a berth may be taken up farther out on the same bearing.

**Pilot and steam tug.**—A pilot is obtainable for the river between the lighthouse and the town, but not for the bar. A small steamer is sometimes available for towing sailing vessels. The charge for the tug is about 1s. 3d. per gross ton register, and for pilotage in and out, about £10.

Pilotage dues are compulsory, men-of-war excepted (1887).

**The RIVER** is entered between Tangalane point and Olinda point; from thence there are three channels to the town, named respectively Olinda, Militáo, and East channel; the Militáo is the best.

**The bar** extended  $4\frac{1}{2}$  miles from the lighthouse in 1884; it varies in different seasons, and especially after south-west gales. At high water it is generally smooth.

The bar has about 21 feet at high water springs;† thence between Carrollos, Marinhos, and Tangalane banks, the latter dry at low

\* See Admiralty plan :—Kilimán river, with view, No. 650; scale,  $m = 1\cdot6$  inch; it does not, however, now correctly represent the entrance.

† About the same depth was found by H M.S. *Swallow* in 1892.

water, the channel is nearly one mile wide with much deeper water. Tangalane bank is reported to have extended south-westward, but its limit is not definitely known. pp. 209-222.

**A patch** of 7 feet, however, is situated with the lighthouse bearing N.  $15^{\circ}$  E., distant  $2\frac{8}{10}$  miles; the channel is westward of it.

The channel formerly known as the boat channel, close along Olinda point, is closed, but it is possible that it may again become available for boats.

**Buoys.**—A fairway and seven other buoys mark the entrance to Kilimán river, and Militáo channel, placed as follows, and numbered consecutively from seaward. Nos. 1, 2, 6, and 7, are starboard hand buoys entering the river; Nos. 3, 4, and 5 are port hand buoys entering.\*

A fairway buoy, spherical, with staff and cage, painted black and white in horizontal stripes, lies with Tangalane point flagstaff N. by E.  $\frac{1}{2}$  E., distant 5 miles.

No. 1 buoy, a large black conical buoy, easily distinguished from seaward, lies with Tangalane point flagstaff bearing approximately N. by E.  $\frac{3}{4}$  E., distant  $2\frac{4}{10}$  miles.

No. 2 buoy, can, lies with Tangalane point flagstaff bearing N.  $\frac{3}{4}$  E., distant  $1\frac{2}{10}$  miles.

No. 3 buoy, can, lies with Tangalane point flagstaff bearing N.E. by E.  $\frac{1}{4}$  E., distant 8 cables.

No. 4 buoy, can, lies with Tangalane point flagstaff bearing S.E.  $\frac{1}{4}$  S., distant  $1\frac{2}{10}$  miles.

No. 5 buoy, can, lies with Tangalane point flagstaff bearing S.E.  $\frac{1}{2}$  E., distant  $1\frac{9}{10}$  miles.

No. 6 buoy, can, lies with Tangalane point flagstaff bearing S.E.  $\frac{3}{4}$  E., distant  $2\frac{8}{10}$  miles.

No. 7 buoy, red can, lies with Tangalane point flagstaff bearing S.E. by E., distant  $3\frac{4}{10}$  miles.

The buoys formerly marking Olinda channel have been withdrawn.

The beacon on Tangalane point, and the beacons for leading through Militáo channel, have been removed.

**Caution.**—The positions of these buoys are not to be depended on, as they are moved when the channel alters.

**Tides.**—It is high water, full and change, at about 4h. 20m.; springs rise  $12\frac{1}{4}$  feet, neaps  $7\frac{1}{2}$  feet; the tides are said to be irregular and to extend 50 miles up the river.

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\* Originally published in Notices to Mariners, No. 184 and 271 of 1892.

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The streams run about 3 knots an hour in the river ; after crossing the bar and nearing the lighthouse, the flood sets directly on to the banks of Olinda point, rendering great care necessary.

The ebb commences at Olinda point about half an hour before it does at Tangalane point.

**Current.**—The current generally sets from one to 2 miles an hour to the south-westward, causing vessels at anchor off the bar to lie broadside to the swell and roll considerably.

**Directions.**—The British India steamers, drawing 15 feet, enter the river and proceed to the town, the pilot boarding them off the lighthouse, but it is not advisable for a vessel drawing over 10 feet to cross the bar without the assistance of the pilot, or a boat ahead sounding.

Entering Kilimán river—from abreast the fairway buoy, Tangalane point flagstaff will bear N. by E.  $\frac{1}{2}$  E., and No. 1 buoy will be seen a little on the starboard bow,—proceed with the flagstaff on that bearing, which leads westward of the 7 feet patch off Tangalane bank, until No. 1 buoy is abeam, when the bar will have been crossed in the deepest water; leave that buoy about  $1\frac{1}{2}$  cables on the starboard hand, and when abreast of No. 2 buoy, alter course to about North, which will lead through the fairway past No. 3 and 4 buoys ; round No. 4 buoy, and steer towards Red tiled house (easily seen) on the west bank of the river, leaving No. 5 buoy on the port hand, and No. 6 on the starboard hand ; give No. 7 buoy a berth of at least  $1\frac{1}{2}$  cables on the starboard hand, and thence to the anchorage off the town, the deepest water will be found at the distance of about one cable from the western bank of the river. In Militáo channel the streams set across both ends, and should be guarded against. It sets fair, however, through its middle portion.\*

**Caution.**—It must not be assumed that these directions will remain available for long, as the banks are constantly changing. The breakers are said to be a better guide than the chart, but much precaution is necessary, especially in boats crossing, as the breakers are so treacherous, that a solitary wave at times comes in and breaks heavily when the water on the bar appeared smooth immediately before. Many lives have been lost, amongst others a native pilot of experience and all his crew perished.

**Anchorage.**—There is very good anchorage about one mile north-westward of the lighthouse, northward of the creek, in about 5 fathoms ; the tide runs about 3 knots an hour.

p. 220. **Pequena island**, situated in mid-river, is low and covered with dense jungle ; extensive banks extend both north and south of this

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\* Buoyage and directions, from H.M.S. *Swallow*, dated March 1892, and published in Notice to Mariners, No. 184 of 1892.

island, leaving a channel to the town close along both shores. The bank has extended southward into Militáo channel since the survey of 1885, as now charted. pp. 209-222.

**Militáo bank** separates Olinda and Militáo channels ; it dries for a distance of 2 miles in a north-west and south-east direction, and about one mile north and south, and is subject to change. Mangroves are growing on the high part of its north-west side, affording a guide to the best water, which is about 2 cables northward of them.

**Militáo channel**, with an average width of half a mile is between Militáo bank and the bank extending southward from Pequena island ; it is straighter, has more water, is buoyed, and is easier of navigation than Olinda channel.

**Buoyage and directions** are previously mentioned.

The streams run across both ends of Militáo channel, but straight through the other parts.

**East channel** runs close along the eastern bank of the river, and has a depth of 21 feet at high water ; from abreast the lighthouse the river bank should be followed, at about one cable distant, until abreast the north-west end of Pequena island, where a shoal extends  $1\frac{1}{2}$  cables from a rounded point ; after passing this shoal the shore may again be followed to the town.

**Olinda channel** is southward of Militáo bank, and was almost entirely that used previous to the survey in 1885. It is obstructed by shoals, unbuoyed, a strong current sets across it, and no directions can be given that would be of use to a stranger.

**KILIMÁN** is situated on the eastern or left bank of the river at 10 miles above Tangalane point at the entrance. It ranks next in importance to Mozambique, and is the head-quarters of the Zambesi trade. The church and barracks are conspicuous buildings, and the town is surrounded by cocoa-nut trees. There is a landing available at all times, close to the custom-house and jetty government offices.

Moorings are laid for two government steam vessels off the landing place, and the mud bottom is very soft.

**Trade.**—The African Lakes Company have their head-quarters at Kilimán, and with other European firms do a considerable export trade in oil-seeds, ivory, rubber, skins, and beeswax. A considerable portion of the Zambesi trade passes through Kilimán, as already mentioned on p. 34 ; it is conveyed in canoes or lighters up the Kilimán or Kwa Kwa river to Marendene, or Mopea just beyond it, depending on the amount of water in the river, a distance of about

pp. 209– 80 miles, whence it is carried across to the banks of the Zambesi, to  
222. Mazaro or Vicente, and re-shipped. Steamers of 6 feet draught go up as far as the junction of the Mutu with the Kilimán.

The imports are fire-arms, cotton goods, knives, toys, and beads. The value of the exports in 1885 amounted to about £95,000, nine-tenths of which were seeds and ivory; the imports amounted to £103,000.

The population consists of a Portuguese military commandant and other government officials, a few Europeans, some half-caste soldiers, and about two thousand blacks (1888).

**Supplies.**—Fresh provisions, beef, poultry, vegetables, and fruit can be obtained in small quantities; the water, obtained from wells in the sand, is scarce and bad. Except beef, provisions may be obtained cheaper by anchoring on the west shore 6 or 7 miles below the town, where the natives bring supplies down.

Slight repairs to vessels, such as carpenters', blacksmiths', and caulkers' work, can be effected at reasonable rates. About 12 vessels enter the port annually besides mail steamers and coasting craft.

**Mails.**—There is monthly mail communication (irregular) with the Cape Colony. *See* Mails, p. 5 of this supplement.

**Winds.**—The prevailing wind off Kilimán is from S.E. to South during the greater part of the year. From January to March probably it is westward of South. Whilst lying off Kilimán in October, the winds varied from S.S.E. to E.S.E., and blew throughout the night, only lulling in the morning; but this is unusual, a land wind generally setting off at night. Off the town, in July, the sea breeze from about S.S.E. was observed to set in at noon with a force of 1 to 3; during the night it was usually calm, with the land breeze in the morning. *See* Wind in Zambesi, p. 34.

**Climate.**—The climate is unhealthy, and said to be unfit for Europeans. Temperature in the early morning (July) has been noted as low as 62°. The heaviest rains occur in January and February, accompanied by much lightning.

## CHAPTER VII.

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**MOZAMBIQUE HARBOUR.**—**Landmarks.**—A new church has been recently constructed 200 yards S. 27° E. (true) from the green lights on the end of the pier, Mozambique island. Its white spire about 140 feet in height is a conspicuous object from seaward.\*

\* H.M.S. *Stork*, 1889.

A bank of considerable extent, with depths of 3 to 5 fathoms, exists p. 238. about half a mile westward of Leven bank, where 6 to 7 fathoms are shown on the plan (662). There is probably less water.

Fort Lorenzo is no longer a fort, but is used as a powder magazine. p. 239.

**Leading light and beacon.**—Harpshell spit beacon is situated p. 240. 300 yards N.N.E.  $\frac{3}{4}$  E. of the position given in bottom line, p. 240 ; Cabeceira light is situated N.  $13^{\circ}$  W. distant  $1\frac{8}{10}$  miles from it, and must be amended accordingly.

**Pomba bay.**—Soundings of 7 to 8 fathoms were obtained by pp. 251, H.M.S. *Raleigh*, 1890, from one to  $1\frac{1}{2}$  miles northward of Maunhane 252. point, where no soundings have been hitherto charted. As shoaler water may possibly exist, caution is necessary when navigating in that locality.\*

## CHAPTER VIII.

**Mnazi bay.**—Lines 6 and 9 from bottom. The conspicuous tree p. 282. no longer exists ; it has been blown down. Also p. 283, line 18.

**MIKANDANI HARBOUR. — Buoyage.** — The under- pp. 285–6. mentioned buoys and beacons have been placed (1891) in Mikandani harbour entrance, and within the harbour :—†

1. A black conical buoy, marked 1, to be left on the port hand entering Mikandani harbour, lies in about  $4\frac{1}{2}$  fathoms water, with the south extreme of Pemba point bearing S.W.  $\frac{5}{8}$  W. distant  $1\frac{3}{10}$  miles.

2. A black conical buoy, marked 2, to be left on the port hand entering the harbour, lies in about  $3\frac{1}{4}$  fathoms water, with the south extreme of Pemba point bearing S.W.  $\frac{7}{8}$  W., distant  $9\frac{1}{4}$  cables.

3. A black conical buoy, marked 3, to be left on the port hand entering the harbour, lies in about 4 fathoms water, with the south extreme of Pemba point bearing S.W. by W.  $\frac{3}{4}$  W., distant  $4\frac{3}{4}$  cables.

4. A red spar buoy, marked A, and surmounted by an A, to be left on the starboard hand entering the harbour, lies in about 4 fathoms water, with the south extreme of Pemba point bearing S.W. by W.  $\frac{1}{8}$  W., distant 7 cables.

5. A white beacon, surmounted by two triangles (points upwards), marks the rocks on the south side of the harbour, with the Custom house bearing S.S.W. distant 3 cables.

\* See plan of Pomba bay on chart No. 1809.

† See plan of Mikandani bay, with plan of Mikandani harbour entrance, No. 684. SO 11431.

- p. 286. **Directions.**—Line 13 *after* southerly—add, passing between the black buoys on the port hand and the red spar buoy on the starboard hand, but too much dependence must not be placed on these buoys maintaining their assigned positions.
- p. 288. **Directions**—A new custom house, white, and twice as high as the old one has been built at the west extreme of the beach. Omit lines 6 to 15 and insert.—Proceeding for the river, do not close the coast within  $2\frac{1}{2}$  miles until the new custom house at Sudi is well open. This custom house in line with a gap in the distant hills, (see view on sheet 681) bearing S.W. by S., leads westward of Nymphe shoal and nearly up to the entrance to the river. When Madjovi high rock bears S.W.  $\frac{1}{2}$  W., edge to the eastward until the old custom house is about its own width open of the sand spit extending from Ras Swa Swa,\* which will lead in mid-channel to the anchorage off Mwanian.
- p. 290. **Lindi river.**—Foot note p. 290.—H.M.S. *Boadicea* in January 1890, found a depth of  $4\frac{3}{4}$  fathoms on the bar at one hour before high water and experienced no difficulty in entering. Her draught was nearly 24 feet.
- p. 303. Line 12 from bottom and p. 305 line 17.—Gingwera tree is no longer to be distinguished from those around it.
- p. 303. **Anchorage.—Buoy.**†—A red barrel buoy, marked with an anchor, and surmounted by a white flag, has been placed off Kilwa Kivinje, in about  $3\frac{1}{2}$  fathoms water, with the station building bearing S.S.W., and distant  $1\frac{1}{4}$  miles from the shore.
- pp. 307–323. **Mafia channel.**†—It was intended (1891) to buoy the under-mentioned reefs in Mafia channel and approaches.—Poiiasi reef, p. 307 ; west end of Machangi, p. 308 ; east end of Membueso, p. 309 ; Mange reef, p. 316 ; the south and west extremes of banks off Ras Kisimani, p. 317 ; north and south extremes of Al Hadjiri reef, p. 318 ; north-east extreme of Sefo, p. 318 ; north extremes of Wumi and Fili, p. 322 ; and the west entrance of Gordon reef, p. 323.

## CHAPTER IX.

pp. 335–339.

**DAR-ES-SALAAM.—Buoyage.**‡—Spar buoys, lettered, have been placed to mark the starboard side of the channel, on entering, and conical buoys, numbered, the port side, as follows :—

\* See plan of Mgau Mwanian, No. 681. Insert the word *old* before custom house in foot note, p. 288.

† See Admiralty charts, Nos. 1030 and 662.

‡ See Admiralty plan of Dar-es-Salaam, No. 674.

A black conical buoy, marked Dar-es-Salaam, 1, marks the north extreme of Makatumba reef, with Hammond rock S.S.E. about 4 cables. A white spar buoy, with two inverted triangles, marks the south-east extreme of Daphne reefs, with Hammond rock S. by E.  $\frac{1}{2}$  E.  $1\frac{1}{3}$  miles. A red pillar buoy with letter A on the top mark, lies just westward of the line of the beacons on Ras Rongoni, with Ras Chokir pillar W. by S.  $9\frac{1}{2}$  cables. A black conical buoy, marked 2, lies just eastward of the line of the beacons on Ras Rongoni, with the outer beacon S. by W. about  $2\frac{1}{2}$  cables. The south-east extreme of North Sandhead spit is guarded by a red spar buoy with top mark marked B. A red spar buoy, with top mark marked C, lies in  $4\frac{3}{4}$  fathoms with the baobab on West Ferry point S.W. by W.  $3\frac{1}{4}$  cables.

A black conical buoy, marked 3, marks the north extreme of the shoal off Ras Makabe, with that point bearing S.W., distant  $1\frac{1}{2}$  cables.

Ras Rongoni leading beacons are white, and surmounted by triangles.

Two white beacons are situated on the shore eastward of East Ferry point. The back one is a long horizontal plank; the front beacon in line with either end, marks the extremes of the  $2\frac{3}{4}$  fathom bank in mid-channel.

Too much dependence must not be placed on the buoys maintaining these positions.

**Landmark.**—A conspicuous white look-out tower has been erected on East Ferry point. It is about the first object sighted from the offing.

**Pilot.**—The German authorities will provide a pilot if so requested.

**ZANZIBAR CHANNEL.—Buoyage.**—The following buoys and beacons mark the reefs mentioned in Zanzibar channel.\*

A beacon with triangle is erected on Fungu Yasin sandhead p. 343.

1. A white spar buoy, marked *Kitap*, and surmounted by two triangles points averted from each other (eastern edge mark), lies in 9 fathoms water, E.N.E. from Kitapumbe reef, p. 344.

Approximate position, lat.  $6^{\circ} 31' S.$ , long.  $39^{\circ} 8\frac{1}{2}' E.$

2. A white spar buoy, marked *Bagamoyo*, and surmounted by two triangles points upwards (northern edge mark), lies in 6 fathoms water, off the north end of Kbandahodi shoal, p. 345.

Approximate position, lat.  $6^{\circ} 24\frac{1}{2}' S.$ , long.  $38^{\circ} 57\frac{1}{4}' E.$

\* See Admiralty charts :—Zanzibar channel, No. 640 *a* and *b*; and No. 661 SO 11431

p. 343-  
354.

3. A red barrel buoy, marked with an anchor, and surmounted by a white flag, lies in about 2 fathoms water, N.E. of Bagamoyo station,  $1\frac{1}{2}$  miles from the shore, and indicates the anchorage, p. 347.

Approximate position, lat.  $6^{\circ} 25\frac{1}{2}'$  S., long.  $38^{\circ} 55\frac{3}{4}'$  E.

4. A white spar buoy, marked *Windi*, and surmounted by two triangles points towards each other (western edge mark), lies in 7 fathoms water, westward of Windi patch, p. 350.

Approximate position, lat.  $6^{\circ} 14'$  S., long.  $38^{\circ} 55'$  E.

5. A red barrel buoy, marked with an anchor, and surmounted by a white flag, lies in about  $2\frac{1}{2}$  fathoms water, E.S.E. of Saadani station,  $1\frac{1}{2}$  miles from the shore, and indicates the anchorage, p. 352.

Approximate position, lat.  $6^{\circ} 3'$  S., long.  $38^{\circ} 48'$  E.

6. A white spar buoy, marked *M K W J*, and surmounted by two triangles points downwards (southern edge mark), lies in 4 fathoms water, at the S.S.E. edge of Mkwaja patches, p. 353.

Approximate position, lat.  $5^{\circ} 49\frac{1}{4}'$  S., long.  $38^{\circ} 55\frac{1}{2}'$  E.

8. A white spar buoy, marked *K P M B W*, and surmounted by two triangles points towards each other (western edge mark), lies in 20 fathoms water, westward of the Kipumbwe reefs, p. 354.

Approximate position, lat.  $5^{\circ} 38\frac{1}{2}'$  S., long.  $39^{\circ} 0'$  E.

p. 356. **Pangani bay.—Buoyage.**—The undermentioned buoys and beacons were placed in Pangani bay in 1891 :—

1. A black and red spar buoy, marked *Pangani*, and surmounted by a St. Andrew's cross and the letter P, lies in 2 fathoms water, N.N.E. of Ras Kikokwe, and with the two triangular beacons on the north side of the entrance to Pangani river in line.

Approximate position, lat.  $5^{\circ} 26\frac{1}{2}'$  S., long.  $39^{\circ} 0\frac{1}{2}'$  E.

2. Two white beacons, consisting of a vertical plank against a white wall, are situated on the shore between Ras Kikokwe and Ras Muhesa.

3. A black and red spar buoy, surmounted by a St. Andrew's cross, lies in  $1\frac{1}{2}$  fathoms water, in the fairway N.E. of Ras Muhesa.

4. Two white triangular beacons are situated on the north shore of the entrance to Pangani river.

5. A white spar buoy, marked *South Hd.*, and surmounted by two triangles points downwards (southern edge mark), lies in 14 fathoms water, near the southern end of South head reef, p. 399.

p. 365.

Approximate position, lat.  $5^{\circ} 23'$  S., long.  $39^{\circ} 6\frac{1}{4}'$  E.

p. 368.

**ZANZIBAR.—Southern pass.**—A shoal composed of coral heads, about 3 cables in extent, with a least depth of  $2\frac{1}{2}$  fathoms, has

been found off Ras Chugwani, east side of Southern pass, with the conspicuous house on Ras Buyu bearing S.E. by E. distant  $1\frac{5}{8}$  miles and north extreme of Chumbe island S.S.W.  $\frac{5}{8}$  W.\*

**Buoyage.**—A black can buoy is moored in 5 fathoms water near p. 370. the eastern edge of Kisiki reef, with Mbweni house bearing E. by S., distant  $1\frac{4}{5}$  miles, and Conspicuous house on Ras Buyu S.S.E.  $\frac{1}{2}$  E.

A red can buoy is moored in 6 fathoms water near the western edge of Mtwana reef, with Mbweni house bearing E.N.E., distant  $1\frac{3}{10}$  miles, and Conspicuous house on Ras Buyu S.E.  $\frac{1}{4}$  E.

**Mails.**—Lines 4 and 5, *omit the words*, and monthly to the Cape p. 373. of Good Hope *via* the East African Ports, as the service is discontinued. See p. 5 of this supplement.

Line 5 before Madagascar, *insert* Mayotta.

**Telegraph.**—Line 14, after Aden, *add* Mombasa. Line 16, *add*— p. 373. A submarine cable has been laid to Bagamoyo, thence to Dar-es-Salaam. Amend pp. 335 and 346.

**Western pass.—Directions.**—Walleso house is completely p. 374. hidden by the trees, and the jail no longer exists.

Lines 4 to 6 from bottom, omit and insert :—Steer in about S.S.E., midway between Bawi and Mapape reefs, until the trees around Walleso house on the brow of the hill are in line with the small house between the English Consulate and the Telegraph building, bearing E.  $\frac{1}{4}$  S.

After line 2, *add*—A new palace for the Sultan has been built on p. 376. the north side of the stream, situated  $2\frac{1}{2}$  miles northward of Bet-el-Ras. It is a large white building with lofty columns, and has a metal roof. Near it are the waterworks with a tall chimney.

**English pass.—Buoyage.**—The buoyage of English pass, 1891, p. 377. is as follows :—

1. A can buoy, black and red chequered, is moored in  $3\frac{1}{2}$  fathoms water on the southern edge of Seagull shoal, with White Block house bearing E. by N.  $\frac{1}{4}$  N., distant  $1\frac{6}{10}$  miles, and large house on Bet el Ras S.S.E.

2. A black can buoy is moored in 5 fathoms water on the bank northward of Bet el Ras, with Bububu house bearing E. by N.  $\frac{5}{8}$  N., distant  $6\frac{1}{2}$  cables, and large house on Bet el Ras S. by E.

3. A black can buoy is moored in 5 fathoms water, about half a cable seaward of the edge of the bank off Bet el Ras, with Bububu

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\* See Admiralty charts of Zanzibar approaches, Nos. 665 and 640a.

house bearing N.E.  $\frac{1}{2}$  N., and large house on Bet el Ras S.E., distant 3 cables.

4. A red can buoy is moored in  $6\frac{3}{4}$  fathoms water near the eastern edge of Chapani reef, with White stone pillar bearing N.E. by E.  $\frac{1}{2}$  E., distant  $5\frac{1}{2}$  cables, and square white house S.  $\frac{1}{4}$  W.

5. A red can buoy is moored in 7 fathoms water near the eastern edge of Chapani reef, with White stone tower bearing N.E.  $\frac{3}{4}$  E., distant  $6\frac{1}{2}$  cables, and square white house South.

**Directions.**—Line 11 from bottom, *after* Ras, *add*, marked by black buoys,—

Lines 4 and 9 from bottom. Kedichi and Walleso houses are now completely hidden by the trees in front of them.

p. 381.

**LIGHTS.**—**Mwana Mwana** light, *fixed white*, is now exhibited, but its regular exhibition should not be relied on. It is shown from a pyramid, painted white, and about 65 feet in height.

Mungopani lighthouse has a white top (not red), and the base of the tower is painted a dark red colour. The light is reported as feeble, 5 miles being about the extent of its range.

**Ras Kizimkazi.**—The intention of establishing a light here has been abandoned. The portion of the tower, 12 feet high, appears like a ruin.

Omit the second paragraph of the Caution.

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## CHAPTER X.

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### PEMBA ISLAND, AND THE ADJACENT COAST, BETWEEN PANGANI BAY AND THE EQUATOR.

(*Pages 388 to 398, relating to Pemba island, are hereby cancelled.*)

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#### VARIATION IN 1892.

Pemba island,  $9^{\circ} 50'$  W.—Tanga bay,  $10^{\circ} 0'$  W.

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### PEMBA ISLAND.

pp. 388–  
398.

**General Remarks.\***—Pemba island, named by the Arabs Al Húthera (the Green), lies 22 miles north-eastward of Zanzibar island, of which it is a dependency.

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\* Derived from a Survey by Commander W. J. L. Wharton, H.M. Surveying vessel *Fawn*, 1878, and Lieut. A. Balfour, H.M.S. *Stork*, 1890. See Admiralty general charts:—Delagoa bay to Ras Asir (Guardafui), No. 597; Africa, east coast, sheet X., including Zanzibar and Pemba islands, No. 664. Admiralty plans:—Kiuyu, Cockburn, George and Chaki Chaki, No. 1812, scale  $m = 1\cdot5$  inches; and Pemba, south-west portion, No. 1310.

It extends in a north-north-east and opposite direction for a distance of 38 miles, and is about 13 miles wide (including the islands off its western side which protect the numerous harbours on that coast). pp. 388-389.

The reef off the western side of Pemba island is generally steep-to, and less than one mile from the coast or the islets.

The eastern coast of Pemba is faced with a reef extending about half a mile off, and is apparently steep-to, with breaks opposite several creeks that indent the coast; these breaks probably afford passage in smooth weather to boats.

The height of Pemba island does not exceed 300 feet, and its surface is broken into ridges and valleys, covered with luxuriant vegetation. The soil is rich, the principal produce being cloves; most of the groves of which trees are situated on the western part of the island; 120,000*l.* worth of this spice being about the annual export. All tropical cereals and edible roots flourish, and on the eastern side the Wapembe, or descendants of the aborigines, tend considerable herds of cattle. Cocoa-nuts abound. The island is governed by a Wali, appointed by the Sultan of Zanzibar, who resides at Chaki Chaki, the only town of any size in the island.

Pemba makes as a low island with uniform outline, and cannot be seen far at night unless by moonlight. By day it is visible from a distance of about 15 miles.

**Harbours.**—Chaki Chaki is the best harbour, and most easy of access; it affords shelter for all classes of vessels, and from all winds, but the depths are inconvenient for anchorage in many parts of it. Kingoje bay, Ngelema bay, port Cockburn, and port George are also good harbours, but the two latter are not so easily accessible. The best entrance to port Cockburn is through Chaki Chaki bay, by Owen channel. Port Kiuyu is also a good anchorage.

**Caution.**—A good look-out from aloft should be kept when entering any of the anchorages in Pemba, as shoals may exist which are uncharted; and the time for entering chosen when the sun is in a favourable position if possible. Owing, however, to the muddy state of the water at times, the shoals are not always discernible from the masthead. The bearings of Mangrove points must be used with caution as the points are liable to grow out. *See* Caution on p. 63.

The tide runs strong in all the gaps except that of Mesale.

**PEMBA.—SOUTH-WEST AND WEST COASTS.**—The south-west side of Pemba island, westward of Ras Upembe, is fronted by a detached sunken reef, some 10 miles in length, on

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398.

which are several islands and rocks above water. Between this reef and the coast is the Upembe passage, which is much used by dhows. A description is here appended, but the chart will afford more information than a written description of these passages.

**Ras Upembe**, the south point of Pemba, is a bold cliffy point 15 to 20 feet high, clear of bushes for 50 to 100 yards from its outer edge. It is steep to and the sea breaks heavily against it at times. The small sand beach on its western side is very conspicuous from the south-westward. Upembe passage lies close westward of it.

Two miles northward of Ras Upembe is the eastern entrance of Upembe passage, which is marked by a small coral islet about 15 feet high. Between the islet and Ras Upembe are two white sand beaches.

**Clump.**—A little northward of the east entrance to Upembe passage is a conspicuous clump of trees 80 feet high. It shows clear of Ras Upembe on a N.E.  $\frac{1}{4}$  E. bearing.

**South Ras Domoni and Observation point**, the entrance points of the bay north-westward of Ras Upembe, are cliffy, overhanging coral projections, with bushes close up to the edge of the cliff.

**Hinsuani islet**, 54 feet in height, and the Twins 31 and 28 feet high, are wooded islets, with cliffy coral overhanging shores, situated on the reef at about one mile westward of Ras Upembe. The reef dries around them at low water.

**Miugani islet**, situated 2 miles westward of Hinsuani islet, is 50 feet high, thickly wooded, with an overhanging coral cliffy islet 30 feet high on its north side. The surf breaks against it at high water, but at low water the reef dries for some distance round it.

**Ras Miugani**, (Saïd point) the southern point of the island of Pansa, is a bold cliffy coral point 40 feet high; it has a conspicuous white sand beach on its western side. The surf breaks against it at about half tide.

**Yombi, Pansa, and Matumbene islands**, and the three between, are practically the same island, being only separated by mangrove creeks, which are available for boats at high water. They are all thickly wooded and about 100 feet high.

On the south-west side of Matumbene island there is a long white sand beach, backed by a grove of casuarina trees.

There are several other islets and rocks on the reef off Matumbene island, but they are not easily distinguished, and generally appear as part of the coast.

**Panani or White islet**, 55 feet high, westward of Pansa, has a cliffy coral shore and is covered with bushes and trees; the highest part being a clump of dead white trees. It is very conspicuous from the south-eastward, and shows clear of the land on a W.N.W. bearing. pp. 388-398.

**Sumwago islet**, a bare coral islet with overhanging cliffs 20 feet high, westward of Matumbene, stands well out on the reef and shows clear of the main island when seen from the southward.

**Matumbe Makupa (Soleman island)**, situated two cables northward of Matumbene island, is 149 feet high and thickly wooded, with cliffy coral shore on the western side. The reef dries between it and Matumbene.

Middle islet, 16 feet high, shows conspicuously between Kwata (Brisk island) 25 feet high, and Matumbe Makupa.

**Barue (Matumbuu) rock**, 35 feet high, is covered with bushes and has coral cliffy shores. It shows well clear of the main island from both north and south.

**Makungwi island**, the north-easternmost of the group is  $1\frac{3}{4}$  miles in length, east and west, between which and the coast of Pemba is Upembe passage. The island is partly cultivated, has several low hills, and the tops of the cocoa nut trees are about 100 feet above high water.

**Depôt.—Anchorage.**—There is fresh water at Pochin beach, near the north extreme of Makungwi; and a depôt established for H.M. boats cruising. There is anchorage about  $1\frac{1}{4}$  miles northward of the depôt with the west extreme of island S.W. by S. and east extreme S. by E.  $\frac{3}{4}$  E. in about 10 fathoms. The anchorage, for small vessels only, should be carefully approached on the latter bearing.

**Reefs.**—The fringing reef curves gradually round outside the above-mentioned islands and always breaks. It is steep-to, and its outer edge dries at low water. Abreast Pansa, there is a passage inside for a short distance. The deep water is easily seen, as the bottom is of white sand. Slave dhows make use of this passage to land in the bay westward of Pansa island.

Northward of Kwata and Makungwi islands the reef, broken in places, and irregular, extends from one to  $1\frac{1}{2}$  miles. Within Makungwi is the Upembe passage mentioned below.

The coast northward of Makungwi to north Ras Domoni, south point of Kingoje bay, is fronted by reef dry at low water to nearly  $1\frac{1}{2}$  miles in places, and with not more than 3 fathoms at 2 miles off shore.

**Dhow passages.—Upembe passage.**—Between the islands above mentioned, and Pemba, the space is filled with reefs and narrow passages much used by dhows and by the cruising boats of

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398.

**H.M. Ships.** The principal channel, from the northward, is between Makungwi island and Pemba, thence along the coast of Pemba to Ras Upembe. It is known as Upembe passage.

There are two entrances from the southward to Upembe passage, the principal one being close westward of Ras Upembe, but at about one mile northward of that point it is almost blocked at low water springs.

H.M.S. *Stork* anchored head and stern in the south end of the passage, west of Observation point, but the tides were very strong and the holding ground bad.

**Current.**—The current divides south of Ras Upembe, off the entrance of Upembe channel, and follows the line of coast to north-east and north-west with a velocity of one to 3 knots an hour, during the north-east and south-west monsoons, respectively. There are heavy tide rips at the dividing of the current, especially when met by the ebb stream running out from the passage westward of Ras Upembe. Off Barue rock (the Western islet of those before mentioned,) and extending for about two miles to the northward there is constant rippling and occasionally overfalls.

**ANCHORAGES.**—**Kingoje bay**, between North Ras Domoni and Ras Kingoje, the east point of entrance to Chaki Chaki bay, is 2 miles wide, but the navigable channel is reduced to half a mile between the reefs which extend about 2 miles westward of Ras Domoni (before mentioned), and the south extreme of Mwamba Kisima. The latter dries at low water springs for the distance of  $1\frac{1}{2}$  miles westward of Kingoje point, and there is not more than 3 fathoms at 2 miles from the point.

Kingoje bay, within North Ras Domoni is reduced by the shoals which encumber it to a breadth of about 2 cables east and west, over a length of about 5 cables, in which space there is a depth of 6 to 7 fathoms, over mud, affording secure anchorage for moderate draught vessels. It is also a capital anchorage for boats, from whence the east coast of Pemba can be reached by the Upembe passage.

Large vessels should anchor farther out in about 11 to 13 fathoms, south-westward of Ras Kingoje. Vessels should be navigated from aloft, as no definite marks are available. The best time for entering is naturally with the sun astern or in the afternoon.

Ngelema bay close northward of Kingoje point, and the bight in the reefs abreast Ras Bandao, southward of Kingoje bay, also afford good anchorage; but like Kingoje bay, the pilotage must be done from aloft and with the sun in a favourable position. *See directions*, p. 61

**CHAKI CHAKI BAY** is included between Mkumbuu peninsula, Ras Kingoje, and the reefs off Mesale island.\* pp. 388-398.

Though there are many shoals in it, there are also large clear spaces, and it affords many good anchorages. The eastern part gradually contracts to the mangrove creek on which Chaki Chaki town stands, 9 miles distant in an easterly direction from Mesale island.

The shores of this bay are richly cultivated with cocoa-nut trees, cloves, and cereals.

**Ras Kingoje**, is the southern limit of Chaki Chaki bay. It is a low point, and not easy to recognize from the westward.

**Mwamba Kisima** extends  $1\frac{1}{2}$  miles westward of Ras Kingoje, and together with the shoal ground extending half a mile west of it must be avoided when entering Chaki Chaki bay.

**Ras Tundauwa**, distant 3 miles north-eastward of Ras Kingoje, is low and fringed with mangrove trees. There is a watering place on the north side, half a mile from the west extreme of the point.

**Shoals.**—The north extreme of the shoal with a depth of 3 feet, extending westward from Fungu Sisimizi, south side of entrance to Chaki Chaki anchorage, is situated with Ras Tundauwa bearing S. by E. distant  $1\frac{1}{10}$  miles. The south limit of the same shoal, about its centre, lies with Ras Tundauwa S.S.W.  $\frac{1}{4}$  W., distant 6 cables.

The patch situated 7 cables N.W. by W. from Ras Tundauwa, extends about  $1\frac{1}{2}$  cables farther north-eastward than was formerly charted. It is composed of coral and is awash in places at low water. Its north-east extreme lies with Ras Tundauwa about S.E.  $\frac{1}{2}$  S., distant 7 cables.

A rocky patch, of 6 feet, lies with Ras Banani white chimney S.  $86^{\circ}$  E., and Ras Tundauwa S.  $52^{\circ}$  W., distant  $4\frac{3}{4}$  cables.

**Ras Banani**, situated on the south side of the entrance to Chaki Chaki inlet,  $2\frac{1}{2}$  miles eastward of Ras Tundauwa, is also low, but tolerably clear of bush. On it there is a white chimney resembling a beacon, which shows well when the sun is in a favourable position. There is another white chimney about a third of a mile south-west of that on Ras Banani.

**Mkumbuu** is a narrow peninsula that divides Chaki Chaki bay from port Cockburn. It is of an uniform height of 50 feet, and has

\* See Admiralty plan of West coast of Pemba island, No. 1812; scale,  $m = 1\frac{1}{2}$  inches.

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398.

many cocoa-nut and palmyra palms. Its western extremity is formed by high mangrove trees.

**Dongo Kundu** is a narrow wedge-shaped projection of bright red sandstone, which extends from the south side of Mkumbuu peninsula, and is a conspicuous object. There is another patch of red cliff, half a mile north-west of it, conspicuous in some lights.

A patch of  $2\frac{1}{2}$  fathoms has been found off the south-east extreme of Mwamba Mkumbuu, with Dongo Kundu bearing E.N.E. distant  $1\frac{4}{10}$  miles. The 5 fathoms edge of Mwamba Mkumbuu south-east extreme, lies N.N.E.  $\frac{1}{2}$  E.,  $3\frac{1}{2}$  cables from it, or about 2 cables eastward of the flat as originally charted.

**Mesale island**, on the west side of the entrance to Chaki Chaki bay, is low, covered with dense forest which attains a height of 70 feet above the sea, and is about one mile in length.

Mesale island is situated on a reef which dries for the distance of about 6 cables south-westward and south-eastward; on these sides also shallow water extends some distance from the edge of this reef, but on the northern side it is steep-to. Northward from Mesale island the reef extends about one cable off, forming the south side of Mesale gap.

Mesale island appears to stand out well from the land behind, when seen from any direction.

**Position.**—The observation spot, north-east extreme of Mesale island, is in lat.  $5^{\circ} 14' 9''$  S., long.  $39^{\circ} 36' 18''$  E.

**Target and Torpedo practice.**—In the north-east monsoon period, the space southward of Mesale island is said to be the best place for torpedo practice (*H.M.S. Blanche*, 1892), and in the south-west monsoon under Ras Kiuyu north end of Pemba.

**Mesale gap**, situated north of Mesale island, and between it and the reef of Uta-wa-limani, is deep, but is not recommended, except at low water and when the sun is in a favourable position, as the reefs on either side are not steep-to, and sometimes do not show well. No leading mark can be given for this channel.

**Anchorage.—Directions.**—To enter Chaki Chaki bay; bring Ras Tundauwa to bear E.  $\frac{1}{2}$  N., when the white chimney on Ras Banani will appear in line with it; steer with this mark on until the left extreme of Mkumbuu peninsula bears N.N.E.  $\frac{1}{2}$  E., when steer for that extreme until the south point of Mesale island bears West. Steer East from this position, with a somewhat remarkable hill with a flat top covered with cocoa-nut trees known as Mifuni hill, directly

ahead, until Ras Kingoje bears S.S.W.  $\frac{3}{4}$  W., or Dongo Kundu N. by E.; <sup>pp. 388-398.</sup> thence steer E. by N.  $\frac{1}{2}$  N. between the reefs on either side until Dongo Kundu bears N.N.W., when steer E. by S. until Dongo Kundu bears N.W., when anchorage may be taken in about 10 fathoms as charted. Vessels can proceed farther in, but the 3-fathom patch half a mile off the eastern side of the bay should be given a wide berth.

Or to proceed to the anchorage south-west of Ras Tundauwa, when the south extreme of Mesale island bears West as before, steer E.  $\frac{3}{4}$  S. with a large castellated house in Chaki (Chaki town, seen over a mangrove islet in the centre of the narrows west of Ras Banani. This will lead to the anchorage in 8 fathoms, with Ras Tundauwa about S.E. by S. distant 8 cables. If the shoals can be made out, a vessel can go farther to the south-eastward.

The anchorage in Ngelema bay, southern portion of Chaki Chaki bay, from a position south-eastward of Mesale, may be steered for when the conical hill (255 feet) bears E. by S.  $\frac{3}{4}$  S., until Ras Kingoje bears S.S.W., whence steer S.E. for the western 100 feet hill, until Ras Kingoje bears S.W. by W.  $\frac{1}{2}$  W.; here is anchorage in about 8 fathoms. *See* caution, pp. 55 and 63.

The one fathom patch, charted  $1\frac{3}{10}$  miles N.E.  $\frac{1}{2}$  N. of Ras Kingoje dries 2 feet at low water springs.

Good temporary anchorage may also be obtained in the north-east monsoon period, or during calm weather, on the bank south of Mesale island in 6 fathoms. *See* Torpedo practice, p. 60.

**Chaki Chaki** is a long straggling town picturesquely situated among mango and cocoa-nut trees at an elevation of 40 feet above high water.

There is a dilapidated fort in the town which is not conspicuous, but some of the stone houses show very clearly from Mesale island, especially the northernmost one, which is castellated.

The town cannot be approached at low-water springs even in the smallest boat, the creek drying completely across, but at half tide there is a sufficient depth of water for a steam pinnacle.

**Supplies.**—A contract has been made here for the supply of beef, bread, and vegetables.

**PORT COCKBURN** is a harbour of great capacity, though much obstructed by reefs, and in many parts having inconveniently deep water. Long bays and creeks indent the shores, in some of which good anchorage can be found; Kokota, Funzi, and Pembe islands divide port Cockburn from port George. Port Cockburn may be entered either by Owen channel or Kokota gap. This port is much used as a head quarters for H.M. ships cruising.

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**Owen channel**, leading from Chaki Chaki bay to port Cockburn, is deep, but contracts at one part to a width of  $3\frac{1}{2}$  cables between the 3-fathom lines. It lies between Uta-wa-limani and the reefs north-eastward of it, and the reef extending from Mkumbuu peninsula. No good leading marks can be given for this channel, but at low water, with care, by the aid of the Admiralty chart, there should be no difficulty in its navigation. The following marks, taken partly from the chart, may prove of some value. From abreast Mesale island, steer in with the north-west extreme of Uvinje island, in line with the east extreme of Kashani island, N. by E.  $\frac{1}{4}$  E., which leads in mid-channel, until the north extreme of Mkumbuu peninsula bears E.  $\frac{1}{2}$  N., thence the course is about E.N.E., allowing for tide, and keeping about 2 cables from the edge of Mwamba Mkumbuu, until abreast the sand bank, which dries 8 feet, thence as requisite. *See* caution, p. 55.

A patch of  $1\frac{1}{4}$  fathoms, with 6 to 7 fathoms around, has been found northward of the fairway in Owen channel, with south-east extreme of Mapanya bearing N. by E. distant  $1\frac{2}{10}$  miles, and north extreme of Mkumbuu peninsula S.E. by E.  $\frac{3}{4}$  E.

**Mwamba Mkumbuu** is an extensive reef extending west from Mkumbuu peninsula; its south-west extreme, on which are isolated patches dry at low-water springs, is situated  $1\frac{1}{2}$  miles from the peninsula; it shoals very gradually from seaward, and is difficult to distinguish.

**Uta-wa-limani** is a long reef extending from Mesale gap to Vikunguni islands, a distance of 4 miles in a northerly direction. This reef is tolerably steep-to on its western edge, but to the eastward it slopes gradually. It dries in places, principally at the southern part.

**Vikunguni and Kashani** islands are both long, narrow, and rocky, being situated on the outer edge of the sea reef  $4\frac{1}{2}$  miles northward of Mesale island. Off the south extreme of Vikunguni the three islets, 15 feet high, are very conspicuous.

**Mapanya island** is rocky, with one or two baobab trees, 30 feet high, that show conspicuously above the other trees; it is situated on the eastern horn of the same reef as the Vikunguni islands.

**Kokota island**, separated from Kashani and Mapanya islands by Kokota gap, has a rocky sea face, and is covered with moderately high vegetation, but has very few palm trees upon it.

**Funzi island**, situated three-quarters of a mile eastward of Kokota, has a central plateau 40 feet in height, covered with lofty palmyra palms and cocoa-nut trees to about 100 feet in height. There is a well on the north side of this island. *See anchorage off north side*, p. 65. pp. 388-398.

**Depôt.**—There is a Naval depôt here, and also a cemetery at the south-east extreme of the island.

**Supplies.**—Fresh provisions are obtainable from the large village on Ras Kinazini, north shore of port Cockburn.

**Shoals.**—A patch of 4 fathoms or less, with 10 fathoms close to, lies with the east extreme of Funzi bearing N.N.E.  $\frac{1}{4}$  E., and south extreme W.  $\frac{1}{2}$  N. A patch of 5 fathoms is also charted about 3 cables south-eastward of it.

Another small patch with a depth of 5 fathoms, and 7 to 9 fathoms around, lies with south extreme of Funzi W.  $\frac{3}{4}$  N., and east extreme of Pembe island N. by W.  $\frac{1}{2}$  W. distant 7 cables.

**Caution.**—As the survey on which the plan of these harbours is based was broken off by the ship being ordered elsewhere, before it was completed, it is very possible that other unknown small dangers may exist.

**Pembe island**, lying eastward of Funzi, is somewhat like it in appearance, but smaller, and has more mangrove trees round it. Some red cliffs at the south-west extreme are conspicuous.

**Directions.**—**Kokota gap** is a passage from seaward through the outer reef into port Cockburn, passing northward of Kashani and Mapanya islands, and south of Kokota island. This gap is deep, with well defined edges that dry at low water. About half a mile eastward of Mapanya island are situated two large coral banks, with 4 feet water on the southern and about 10 feet on the northern. The best passage is between these banks, which do not always show well. The east end of Kashani well open of Kokota leads between these banks, as does also the west end of Kashani, touching the north extreme of Mapanya; but it is recommended to navigate at low water by the eye, with the aid of the Admiralty chart. Within the gap, the same method of proceeding must be adopted, to the required anchorage.

The best entrance appears to be through Chaki Chaki bay and Owen channel, before mentioned.

The passages between Kokota and Funzi, is not recommended, as it is narrow and intricate. Between Funzi and Pembe is a boat passage; between Pembe and the mainland it dries at low-water springs.

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**PORT GEORGE** is a large harbour somewhat similar to port Cockburn, but more obstructed by reefs. A long and tortuous creek, similar to that at the eastern part of Chaki Chaki bay, extends inland for some distance from Weti at the north-east corner of this inlet. The shores of port George are densely populated and well cultivated.

The western side of this extensive harbour is formed by the islands of Uvinje and Fundu, southward of which is Uvinje gap, the principal entrance.

**Pasi islet**, 20 feet high and covered with scrub, is situated in the centre of the southern part of port George.

A patch of  $2\frac{1}{2}$  fathoms, coral, with 6 to 8 fathoms around it, was found by H.M.S. *Penguin*, 1888, in the anchorage southward of port George, with Pasi islet bearing N.W., distant  $9\frac{1}{2}$  cables.

**Uvinje island**, on the western side of the channel, and abreast Pasi islet, is a rocky island on the outer reef, separated from Kokota island by Uvinje gap. It is covered with scrub and has several clumps of tall casuarina trees. On its western side are several sandy coves where boats may land at high water.

**Fundu island** is the largest of the outlying islands which form the western side of port George, being  $5\frac{1}{4}$  miles in length and half a mile in breadth. It is flat, without any conspicuous feature, partly cultivated, and has large groves of palmyra palms. There are many small sandy bays on the western shore of Fundu island.

**Haramu passage**, between Uvinje and Fundu islands, affords at half tide a boat passage. At low-water springs it is dry.

**Directions.**—**Uvinje gap** leads into port George northward of Kokota island, and is a perfectly clear channel, safe to navigate when the sun is in a favourable position. A vessel when entering should keep along the edge of the reef on the northern side of the channel until abreast of Pasi islet, to avoid the detached coral shoal north-eastward of Kokota island. There are two small grass-covered rocks on the reef which forms the north side of the channel; the western (a double rock 10 feet high) is about 30 yards within the edge of the reef. The eastern rock, also 10 feet high, is situated about 2 cables within the edge of the reef.

From abreast Pasi island, gradually bring the two grass-covered rocks just mentioned in line astern, bearing S.W.  $\frac{1}{2}$  S., this mark will lead to the entrance to Weti harbour. When Ras Ukunjwi bears North, or the point eastward of Ras Tungwi is open, steer E.N.E. for about half a mile to Weti outer anchorage.

Good objects for fixing the position of the vessel, when approaching or leaving Weti anchorage, are Pasi island, the house at the watering place at Mtambwi, and the rock 20 feet high off Fundu; probably both the 20 feet rocks are useful marks for navigating the channel. pp. 388-398.

**Caution.**—It is advisable to navigate all the gaps at low water.

**Anchorage.**—To proceed to the anchorage northward of Funzi island,—from nearly abreast the eastern 10 feet rock on chart, south-east of Uvinje island, steer to bring this rock only just open southward of a tall bushy tree situated nearly 4 cables within the south extreme of Uvinje island, bearing W. by N.  $\frac{3}{4}$  N. This mark astern, leads in mid-channel. When the west extreme of Pembe island bears S. by E.  $\frac{1}{2}$  E., anchor, or haul towards the island on that bearing until the rock eastward of Kokota is just open northward of it.

There is a good anchorage in port George in 8 fathoms off Mkia-wa-Paca, with Pasi islet bearing S.W.  $\frac{1}{4}$  S., and the north extreme of Uvinje island bearing W. by N.  $\frac{1}{4}$  N.

**Weti harbour.—Buoyage.**—Weti harbour affords secure anchorage in depths of about 4 fathoms abreast Ras Tungwi, gradually increasing to 10 fathoms at one mile westward of that point. The entrance is about a quarter of a mile wide between the reefs on either side. Four temporary buoys have been placed by H.M.S. *Blanche*, 1892, to mark the south side of the channel, and one on the northern side in the inner portion of the harbour; but no dependence must be placed on their maintaining the undermentioned positions.

The western buoy is a barrel buoy with staff and square, painted red, and moored in 8 fathoms, with Ras Tungwi bearing E. by S., distant  $1\frac{1}{2}$  miles.

The next eastward is a spar buoy with swallow-tailed flag, in  $4\frac{1}{2}$  fathoms, with Ras Tungwi S. E. by E.  $\frac{3}{4}$  E., distant 8 cables.

The next is a spar buoy with white flag, with Ras Tungwi S.E. by E.  $\frac{1}{4}$  E., distant  $5\frac{1}{2}$  cables. The fourth and inner is a spar buoy with white swallow-tail flag in 10 feet, and marks the north-east extreme of Ras Tungwi reef, with the point bearing S.W., distant  $2\frac{1}{2}$  cables.

The buoy on the north side of the inner harbour is a black oil drum in 9 feet water, off the edge of the northern reef, with Ras Tungwi S.S.W., distant 5 cables.

**Directions.**—Having followed the directions for port George, p. 64, to the entrance to Weti harbour; the four buoys on south side of harbour should be kept on the starboard hand by vessels proceeding to the head of the harbour, or in their absence, being guided by the reefs on either side which probably are all visible from aloft.

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**Supplies.**—Good supplies are obtainable at Weti. The chief, whose acquaintance should be sought, resides at the conspicuous house at Mtambwi within Ras Tungwi.

**Inner passage.**—The passage from port George northward to port Kishi-Kashi, is shallow, and is not recommended, though available for vessels drawing 10 feet.

**KISHI KASHI PORT** is small and much obstructed by reefs ; it has a somewhat intricate entrance, for though the outer part of the channel (Fundu gap) between the islands of Fundu and Njao is deep and straight, it is narrow, being in one place only about half a cable in width, and the sides are not quite steep-to : the passage also turns sharply to the southward immediately the gap is passed.

If Kishi Kashi port were properly buoyed it would be an excellent harbour, but being without natural leading marks, boats should be anchored on the edges of the reefs in order to enter with safety. It is advisable to anchor in the south-east part of the harbour, where there is most room for swinging and no current is experienced. A beacon is being erected at Kishi Kashi to better mark the entrance to Fundu gap.

At Kishi Kashi port the chief of the Pemba Arab aristocracy resides. He owns all the north part of Pemba island.

**Njao island**, situated northward of Fundu island, between which is the entrance to Kishi Kashi port, is similar to Fundu in appearance. Fundu rock, about 30 feet in height, stands on the edge of the reef near the centre of Njao island, but only shows clear of the island when very close in.

**PORT KIUYU** is a more available harbour than Kishi Kashi port. The entrance is wider, and the clear space inside larger and more directly opposite the entrance. A good berth is in 12 fathoms, with the south point of the main island eastward of Njao island, bearing S.W., and the north-east extreme of Njao island bearing N.W.  $\frac{1}{4}$  N.

Many creeks and bays indent the shores of port Kiuyu, but they are all shallow.

The shores of port Kiuyu are not so thickly inhabited as those of the harbours southward of it.

**Directions.**—**Njao gap** leads from seaward into port Kiuyu. The sides are well defined, except at the southern entrance point, where the reef extends  $3\frac{1}{2}$  cables from the shore, and shallow water extends some distance from the extremity of the reef. The reef on the northern side of the channel is steeper.

There is no difficulty in entering Njao gap at low water, by navigating from aloft, as the shoals are plainly discernible on either side. The last of the ebb sets towards the south side of the entrance. The former marks for entering have disappeared.

**NORTH COAST.**—Northward of Njao gap the coast is nearly straight, with occasional little sandy bays, to Ras Kegomacha.

**Aspect.**—The appearance of the north coast of Pemba island is that of a low tree-covered country, the outline being very uniform; the only point which can be recognised being the low clump on Ras Kegomacha.

Pemba island is safe to approach at night from the northward at a moderate speed and with the lead going. The Pemba knolls are described on p. 68.

**MSUKA BAY** is situated immediately east of Ras Kegomacha, the north-west extreme of Pemba island, and is a good anchorage, protected by reefs on nearly all sides. During the north-east monsoon a swell fetches home, but even then it is a safe anchorage. Msuka is the name of the district on the shores of Msuka bay. A good many dhows are built here.\*

Ras Kegomacha is a rocky point with a conspicuous clump of trees 60 feet in height.

**Kegomacha reef** dries for a distance of 2 miles north-eastward of Ras Kegomacha; the discoloured water northward of this reef makes it appear more extensive than it really is. A sand cay, situated 6 cables northward of Ras Kegomacha, dries 10 feet at low-water springs.

**Directions.**—To enter Msuka bay from the southward, do not round Ras Kegomacha until Ras Kiuyu, the north-east extreme of Pemba island, bears S.E. by E.  $\frac{1}{4}$  E., to clear Kegomacha reef, thence as requisite by cross bearings; anchor in 6 fathoms with Ras Kegomacha bearing N.W., and Ras Kiuyu E.  $\frac{3}{4}$  S. The swell is troublesome here at times, as above stated.

**Sisini creek**, situated about  $4\frac{1}{2}$  miles south-eastward of Msuka bay, is a long but shallow inlet, with several islands and villages. Sisini village lies at the head of the inlet. There is good shelter for dhows in this inlet.

**Ras Kiuyu**, the north-east extreme of Pemba island, is a rocky promontory covered with bush, and faced by cliffs about 20 feet in

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\* See plan of Msuka bay on No. 1812; scale,  $m = 0.5$  of an inch.

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height. On the north side of the point the reef extends but a short distance from the coast, and the anchorage north-west of the point is unprotected.

**Pemba knolls.**—The space between Ras Kiuyu and Ras Kegomacha, is occupied with numerous reefs, known as the Pemba knolls.

The eastern of these only dry at low-water springs, but always break heavily.

Kundeni knoll, the northern of the group, dries 3 feet at low water, and is situated N.E. by E. distant  $4\frac{3}{4}$  miles from Ras Kegomacha.

There is a bank with 4 fathoms least water, lying 2 miles N. by E. of Kundeni knoll.

Funguni knoll, lying  $4\frac{3}{4}$  miles E.  $\frac{1}{2}$  N. from Ras Kegomacha, has a large sand cay which dries 8 feet at low-water springs; Punga Punge lies 2 miles seaward of it. Several patches dry at low-water springs, lie between them and Ras Kiuyu.

The bank of soundings to the depth of 100 fathoms extends for 11 miles northward of Pemba island; but little current is experienced when on it.

**TIDES and CURRENTS.**—It is high water, full and change, at Mesale island, west coast of Pemba, at 4h. 0m. Springs rise 12 feet, neaps 8 feet.

In the northern part of Pemba channel, near the coast of Pemba island, the flood tide setting to the southward neutralises and at times overcomes the constant north-going current, and the ebb accelerates it. The streams meet off Uvinje island and cause a confused sea, dangerous at times to boats. In the southern part of Pemba channel the set is always to the northward, but the amount the current is influenced by the tidal stream has not been ascertained. However, the set of the current in mid-channel is about N.N.W., from 2 to 4 knots in the south-west monsoon period, and 0 to 2 in the north-east monsoon; towards the northern part it also sets in the line of the axis of the channel, or about N.N.E. When at its strength it frequently causes a strong ripple near the island, having the appearance of breakers. At all times a vessel proceeding through Pemba channel will find less current near Pemba island than in mid-channel. The tide runs strongly in all the gaps except that of Mesale.

North-east and eastward of Pemba island the current sets about N. by W., or rather on to the island, and renders any estimation of position very difficult. In December (North-east monsoon period),

off the east coast, it has been found as little as three-quarters of a <sup>pp. 388-</sup> mile an hour. <sub>398.</sub>

**PEMBA CHANNEL.—DIRECTIONS.**—The navigable portion of the channel is contracted by the Wasin and North and South Head reefs bordering the African coast, to a width of 26 miles at the southern entrance, and 19 miles at the northern, but between these dangers and the island it appears to be all deep water.

The eastern side is safer than the western, as the reef extends but a short distance from Pemba island, less current is experienced, and the land is nearer to guide the navigator; but, on the other hand, Pemba island is notorious for its large rainfall, and frequently will be enveloped in rain squalls and clouds, when the western side of the channel is clear.

A steam vessel proceeding northward from Zanzibar, through Pemba channel should, from abreast Mwana-mwana island, shape course direct for Ras Kegomacha; this will allow for the strong northerly current, and lead clear through Pemba channel. *See* directions from Zanzibar, page 384 of the Pilot.

A vessel approaching from the northward, and being able to make Pemba island in daylight, is recommended to steer for Ras Kegomacha, and keep close along the eastern shore of the channel as far as Mesale island; then steer for Mwana-mwana island, allowing about 2 points to the southward for set of current.

The three islets southward of Vikunguni island, and about  $4\frac{1}{2}$  miles northward of Mesale island, are easily identified, and useful for checking the position of the vessel. The reef southward of them shows well with the sun to the westward.

There is nothing to prevent a vessel approaching from the northward, from passing through Pemba channel at night if the weather be tolerably clear; and as before remarked, the island may be approached from that direction at a moderate speed, with the lead going, but it may be more prudent to keep well outside for the night, and steer in at daylight.

Good anchorage may be obtained southward of Mesale island, entrance to Chaki Chaki bay, if not wishing to proceed across to Zanzibar at night. *See* page 61 of this Supplement.

**PEMBA.—EAST COAST.**—The east coast of Pemba is rather low, and should be approached with care at night, but there does not appear to be any danger beyond the coast reef, which, it is stated, nowhere extends more than one mile off, and is steep-to. Within 2 miles of the coast no soundings have been obtained with the hand lead.

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From Upembe passage near south extreme of Pemba island to Mtangani, a distance of about  $7\frac{1}{2}$  miles, the coast is over hanging coral cliffs about 15 feet high, thickly wooded, and fronted by a reef which always breaks.

**MTANGANI** can only be entered by steering from aloft. The passage is clearly defined, and the water smooth as soon as the outer line of breakers is passed. The channel is three-quarters of a cable wide, and the best anchorage is inside to the westward of the point forming the south side of the entrance. H.M.S. *Stork* moored there and found little or no tide. There is a passage for boats through to Kiwani and from there to seaward through Mkiwani channel, available only for boats at high water; the entrance being 3 miles southward of Mtangani.

**Caution.**--Care must be taken in entering or leaving Mtangani, as the current runs strongly along the edge of the reef; but as soon as the outer edge is passed, the current is lost and the tidal stream met running fairly out or in.

The reverse being the case on leaving, the current catching the ship on the bow as she passes the outer edge. So clearly is the difference of current felt, that the bows of the ship may be in the tidal stream while the stern is in the current and *vice versa*.

**Boat channel.**--For about three days on either side of spring tides, there is boat communication between Upembe harbour, northward of the island of which Ras Upembe forms the south extreme; thence along shore within the reef to Mkiwani creek. This entrance has a bar within with 6 feet at high water. Its narrowest part is but 14 feet wide, but is deep. Small dhows use this passage.

**Coast.**--From Mtangani the coast, composed of cliffy, overhanging coral, with numerous indentations and a few sand beaches, inclines to the northward to Mchengangazi. It is lined with trees and bushes to within a few feet of the edge of the cliffs.

**Reef.**--The coast is fringed with a reef which is a steep-to and generally breaks, without any off-lying dangers. The current runs northward strongly along its edge.

**MCHENGANGAZI PASSAGE**, in lat.  $5^{\circ} 06\frac{1}{2}'$  S., is a channel through the reef, about one cable wide. It must be entered by steering from aloft, the deep water being easily seen. H.M.S. *Stork* moored in 7 fathoms,  $1\frac{1}{2}$  miles within the south point of the entrance. The tide sets directly in and out of the passage, and care must be taken on entering or leaving when passing from the current running northward along the reef into the tidal waters, and *vice versa*. Little or

no current was experienced where the *Stork* moored. The large open space inside dries at low water, leaving narrow creeks between. At the head of the inlet a narrow creek and boat passage leads northward past Kodian village into Adamson bay. pp. 388-398.

**ADAMSON BAY.**—No passage could be found leading from seaward into Adamson bay; the reef was breaking right across and the rollers setting into the bay for some distance.

There is a small coral islet off the south point of Adamson bay.

**Landmark.**—On the north point of entrance to Adamson bay there is a conspicuous square clump of casuarina trees, 100 feet high, remarkable by being the only trees of the kind in the vicinity.

Just off the casuarina clump is a small black islet 54 feet high, under the land and not easily seen.

The current sets along the coast with a velocity of one to 3 knots an hour. There is a pretty strong set into Adamson bay at times.

**COAST.**—From Adamson bay the coast trends nearly straight to Ras Kiuyu; it is cliffy, 15 to 20 feet high, with a few sand beaches, and covered with scrub and trees.

**Haycock islet**, a small bare islet 42 feet high, is situated 2 cables from the shore, and  $2\frac{1}{2}$  miles southward of Ras Kiuyu. It does not show very well, being close under the land.

**Landmark.**—At  $1\frac{1}{2}$  miles southward of Ras Kiuyu, and about one cable within the beach, there is a conspicuous rounded clump of trees, 115 feet high. It stands above a slightly projecting point of white sand, the sand extending for nearly a mile.

**Coast reef.**—From Adamson bay northward, the coast reef is steep-to, extending from a quarter to one mile from the shore, with no off-lying dangers; it generally breaks. Between Ras Kiuyu and the clump just mentioned, however, rocky ground extends for some distance, with coral heads, having 2 to 3 fathoms of water over them. They do not break, and it is not advisable to approach the coast within  $1\frac{1}{2}$  miles between Ras Kiuyu and the clump.

The current follows the line of reef running to the northward at a rate of one to 3 knots an hour.

## THE MAINLAND.

**South Head reef.**—See buoy, p. 52 of this Supplement.

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402, 403.

**TANGA BAY.—Buoyage.\***—A white conical buoy, with staff and two black inverted triangles, marks the west extreme of the bank situated  $1\frac{1}{4}$  miles southward of Fungu Nyama; a similar buoy is placed just southward of the 3 fathoms patch, off the south extreme of Ulenge reef. A black and red spar buoy with St. Andrew's cross and letter T above lies in the fairway, S.S.E.  $\frac{1}{2}$  E. distant  $1\frac{1}{2}$  cables from the position of the view. A conical black and white horizontally-striped buoy, with staff and black drum, marks the north extreme of Dixon bank; a small black spherical buoy, marked 2, in about 3 fathoms, the north end of the bank, extending from Ras Kasone, and a red buoy with flag marked A, the east extreme of Tanga island reef. Two white beacons on the shore at Mbegani mark the fairway within these.

In the south channel, a black and white spar buoy with St. Andrew's cross is placed on the bar in 3 fathoms, with Yambe clump bearing N.W.  $\frac{1}{4}$  N.  $1\frac{1}{4}$  miles. A black conical buoy in 3 fathoms, marked 1, guards the ledge extending north-eastward of Rocky islet.

These buoys must not be depended on.

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Line 4 from bottom *add* the southern portion of these reefs is known as Mwamba Wachundo, and dries at half tide. It is vaguely reported to lie nearly a mile eastward of the position charted.

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416.

**GOMANI BAY to CHALE POINT.†—General remarks.**—From Ras Mkadini north-eastward to Chale island the land is low and well wooded, from which an occasional clump of trees and the islands off lying the coast stand up more prominently than the generality. The shore is alternately sand beaches and rocky, with mangrove frontages, and invariably a fringing reef. Between Mkadini and Wasin island a bay is formed, fronted with broken reefs, containing in its centre the island of Sii, and in its north-west part the town of Vanga on a small river of the same name. This vicinity is more cultivated than the northern, viz., from Wasin to Chale, which latter coast is open, with the frontage partaking more the nature of a sunken barrier, from which and from the outer reefs of Wasin bay the 10-fathom line is no great distance; while the 100-fathom line is, speaking generally, within one mile of the

\* See plan of Tanga bay, No. 663; also charts No. 1390 and 664; information from H.M.S. *Boadicea*, 1890.

† Information herein, pp. 72 to 97, on the coast between Gomani bay southward of Wasin, and Gomani bay northward of Malindi, is from the surveys and remarks of the late Commander T. Pullen and of Lieutenant A. Balfour, H.M.S. *Stork*, 1889–90. and cancels the last three lines on page 403 and pages 404 to 416, line 24. See Admiralty chart, Chale point to Pangani, No. 1390.

10-fathom line, and is shown by rippings in calm weather and a confused sea during strong winds. pp. 403-416.

**Landmarks.**—This strip of coast is by no means thickly populated; Vanga, Wasin, and Funzi being the only places of any size. It is drained by several small rivers navigable by the smaller class of dhows for a mile or so; and the background is marked by the following hills, which are the first land made in clear weather, viz. :— Kiluli, of 916 feet, situated 5 miles inland from Ras Mkadini, a rounded hill at the northern end of a coast range of half that elevation; Jombo, 1,573 feet, and Mrima, 1,052 feet, isolated conical mountains 16 and 12 miles respectively north-west of Wasin, with the conical hill Kiruki, 622 feet, about 2 miles eastward of the latter. Jombo is very sharp, whilst Mrima is more truncated; both are visible from Pemba in clear weather.

**Tides and currents.**—The current is very slightly felt inside the reefs and along the shore, but sufficient to make the ebb that sets to the eastward through the Wasin channel run between  $1\frac{1}{2}$  and  $2\frac{1}{2}$  knots during springs, whilst the returning flood either neutralises or slightly overcomes it.

It is high water, full and change, in the Wasin channel at 4h. 0m. Springs rise 12 feet and neaps 8 feet; neaps range 4 feet.

**Winds and weather.**—In the three months June, July, August, 1888, the weather off this coast was as follows :—

		Winds.			Bar.		Ther.	
		—	—	—	—	—	—	—
		S.W.	S.	S.E.	Calm or variable.	in.	in.	° °
June	(days)	28	2	0	0	30·08 to	30·40	70·5 to 80·5
July	„	15	6	5	5	30·15 „	30·32	72 „ 80
August	„	20	2	2	7	30·11 „	30·32	70·5 „ 79·2

In June the rain fell on 16 days and decreased as the season advanced; it fell generally between the hours of 6 and 11 in the morning.

**Coast.**—From Ras Mkadini to the Yimbo river the coast is low and rocky with half a dozen sandy spots, the back land being swampy with interior communication between Gmani bay and the Yimbo river, midway along being Kiruwi a small place where trading is carried on with the inland natives.

**Yimbo river** is the southern of a series of mangrove-lined water-ways, and is 200 yards wide at the entrance. It is barred at low water by reef and sand, with from one to 2 fathoms within, gradually decreasing in width and depth until, at  $3\frac{1}{2}$  miles from the

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bar, the steam whaler of H.M.S. *Stork* could go no further towards Gomani bay. There is a passage for canoes. *See* Directions, p. 77.

The village of Yimbo, situated in a grove of cocoa-nuts on the northern bank, a third of a mile from the mouth, is partially stockaded, and consists of 60 huts and about 200 inhabitants. It is poorly supplied with water and provisions, but fish is plentiful.

Umba river joins the Yimbo from the north-westward at one mile from the sea. It is the only actual river in this neighbourhood, its water being fresh at half a mile above its junction with the Yimbo. It is said to extend northward for one day's march, and then trend to the westward for four days; 2 miles from the coast it runs between high banks 15 yards apart, and through a well-cultivated country; though deep during the rainy it is very low during the dry season, and does not appear navigable at any time. The tide is said to reach to Yasini, about 2 miles above Yimbo, where the river is 20 yards across, but at low water it is dry down to its mouth.\*

**Boundary.**—The mouth of the Umba is the boundary on the coast between the British East African Company on the north, and German Territory on the south.

**Vanga creek and town.**—Vanga creek or Hori Vanga, at  $1\frac{1}{2}$  miles northward of the Yimbo is much smaller and similarly barred. Amongst cocoa-nuts near the entrance, on the south bank, are the ruins of the old town of Vanga, the present town being on the same bank and one-third of a mile farther up. Abreast the town the creek is 100 yards wide at high water, at which time its windings can be followed for  $3\frac{1}{2}$  miles, where it is lost in the swamps; at this distance there was a depth of 12 feet at high water, but landing was impossible. The town is walled and stockaded, contains a small and miserable fort, two or three mosques and about 1,500 inhabitants, the whole in charge of an Akhida (Captain) and 15 to 20 Arab soldiers. It is very dirty, has a mangrove swamp at its back, and must be very unhealthy. Provisions are obtainable and there are several wells, but in the dry season the people have to send to the Umba river, some two miles, for their water, where also are their provision grounds and a large rice cultivation, much of the latter being exported to Zanzibar. Farther back are several small villages of the Udigo tribe, the names of which are given on the chart. *See* Directions, p. 77.

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\* Additions from Report of Commander Arbuthnot, H.M.S. *Mariner*, 1889.

**Juma, Allene, and Pongwe rivers.**—In the bay north and eastward of Hori Vanga and Sii island, are the rivers Juma, Allene, and Pongwe, with collections of huts here and there, and near the Allene a fairly large cultivation of corn. The new chart shows a depth of 3 feet on the bar of the Juma, with one fathom within it. The Pongwe apparently has no bar, and depths of not less than 2 fathoms are shown as far as Kiwe,  $1\frac{1}{2}$  miles above the entrance. Hippopotami are to be met in these rivers, and fish are plentiful.

**Sii island**, situated on the north side of the approach to Wasin from the south-westward, is uninhabited and thickly wooded with mangrove trees that rise in its centre to a height of 95 feet; it is one mile long, half a mile broad, and stands on a long coral reef in the middle of and connected with the north shore of the bay, the latter being completed by a fairly straight run to the eastward of 6 miles of mangrove fronted coast from Ras Kiromo to Ras Wasin, and forming the north side of Wasin channel.

**WASIN ISLAND and reef.**—Trending parallel with and about one mile southward of the coast westward of Ras Wasin, is the coral island of Wasin, the principal hereabouts, and from the southward not easily discernible, whence it looks as if it blended with the mainland; Wasin channel between is clear, and affords good anchorage ground. The island is 3 miles long, east and west, and one mile broad, the trees on it giving an elevation of 70 to 90 feet; one large cotton tree of 94 feet in the north-west part, and two casuarina trees in the middle of the south shore being especially prominent. The fringing reef, of no great extent on the north and east sides of the island, extends off three-quarters of a mile to the southward, and so far to the west-south-westward, viz., 3 miles, as, with the Howard rocks north-west of it, and the reef extending east and south of Sii island, to contract considerably the navigable waters. This south-western portion of the Wasin reef is named Cha, and furnishes a large collection of cowries.

**The town** of Wasin, which has seen better days, now consists of two mosques, three wells, and about 220 huts, with 350 inhabitants; it is situated at the north-west extreme of the island. The water on the island is brackish, nearly all for drinking purposes being brought from wells on the mainland abreast the town. The provision grounds of the inhabitants are also on the mainland; but they are great fishermen, which, with the protection afforded by the island from the periodical raids of the inland tribes, is their great inducement to live on the island.

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A reef fronts the bight in which the town is situated, rendering landing awkward at low water.

In Wasin channel, at half a mile westward of Ras Wasin, and close to the shore, is a small islet like a haycock named Shungilunzi, 30 feet high;  $1\frac{1}{2}$  miles west of which, and within 2 cables of the shore, is a small sand cay on the outer edge of the shore reef, here projecting slightly.

**Supplies.**—Bullocks, sheep and fowls, may be obtained at Wasin, but no fruit or vegetables. Gazelle are to be shot in the neighbourhood. Fish may be had in abundance with the seine.

**Islets and reefs southward of Wasin.**—Three-quarters of a mile southward of the east end of Wasin island, is a group of wooded islets named Pungutiachi, 55 feet in height, on the eastern of which are two prominent fir trees; and three-quarters of a mile farther southward the larger island of Pungutiayu, also wooded to the same height; there is a channel between them, with depths of 5 to 10 fathoms. This group is a distinct feature in making the land hereabouts, a less prominent one being the small islet Kisiti to the westward, on which are a few weather-beaten bushes that rise to 12 feet above high water. Very strong tide rips are found off these islets, and in any weather there is a heavy tumble on.

**The reefs** in the bay, to the westward of Wasin, are Mwezi,  $1\frac{3}{4}$  miles north-eastward of Ras Mkadini, small and uncovering 2 feet, with a good passage about three-quarters of a mile wide inshore of it.

Minyani, two reefs  $2\frac{1}{2}$  miles northward from Mwezi, and which show distinctly; they also have a passage (not recommended) inshore of them.

Kipwa Mtu, very small, with 2 feet least water, situated  $1\frac{1}{2}$  miles eastward of Mwezi, with Bunjuu about one mile farther east and uncovering 2 feet at low water springs.

One and a half miles north-east of Bunjuu is Mwamba Midira, the most considerable reef hereabouts, with a surface composed of sand and coral slime that uncovers 6 to 8 feet in its centre. It is  $1\frac{1}{2}$  miles long, east and west, by one mile across, and shelves only to the north and north-east, where are several heads that block the passage between it and the Mpwa reef; farther north of this latter a short distance is the Mwamba Cha reef before mentioned, with a boat channel between.

Between Bunjuu and Midira reefs is a good broad entrance from the eastward to the Yimbo and Vanga anchorages, but the approach has not yet been surveyed. (*See Directions*, p. 77, 78.) Eastward of Midira reef the barrier reef is broken in places, with a broad gap

between Kisiti and Pungutiayu. Northward of this latter, close eastward of Pungutiachi island, and of Stork patch of 6 feet situated 3 cables E.N.E. of Ras Kisimga Mkono, the north-east point of Wasin island, is a passage leading northward to Wasin, with depths of 7 to 10 fathoms. pp. 403-416.

From this passage the barrier reef again trends north-eastward, with Lockyer patch of 9 feet, situated  $1\frac{1}{2}$  miles eastward of Wasin, and Ship shoals of 3 fathoms,  $2\frac{1}{2}$  miles in same direction; farther north the barrier shows on the edge of soundings, but not by dangerous heads, until the Wimbi reefs are reached off Sambweni, about 7 miles northward of Wasin.

**DIRECTIONS.—Anchorage.—Wasin and Vanga from the eastward.**—Mrima hill in line with Jombo hill, N.W.  $\frac{3}{4}$  N. leads as far in as Ship shoals; when Ras Raschid is discernible, open Jombo northward of it, bearing N.W.  $\frac{2}{3}$  N., which leads in  $5\frac{1}{2}$  fathoms and just clear northward of Ship shoals; and when Ras Mundini bears W.  $\frac{3}{4}$  N. steer W. by N.  $\frac{1}{2}$  N. northward of Stork patch, for the anchorage off Wasin.

To enter Wasin channel southward of Lockyer patch, bring Mrima to bear N.N.W.  $\frac{1}{2}$  W. westerly; on nearing Pungutiayu, Ras Kisimga Mkono will be seen just to the northward of it; proceed on this course until the whole of Kisiti island is shut in behind Pungutiachi east islet, bearing S.W. by W., when steer for Ras Raschid N.  $\frac{1}{2}$  E., until Ras Mundini bears W.  $\frac{3}{4}$  N.; thence W. by N.  $\frac{1}{2}$  N. to the anchorage as before.

**Anchorage** in 7 fathoms with the town flagstaff at Wasin bearing S.W. is recommended, as during the south-west monsoon the swell is felt if anchored farther to the eastward. The reef fringing the shore must be guarded against.

**Tides.**—See page 73.

**Proceeding thence south-westward for Vanga;** from abreast Ras Mundini, in mid-channel, steer W. by N.  $\frac{3}{4}$  N. for one mile, avoiding the patch of  $3\frac{3}{4}$  fathoms, thence W. by S. for the south extreme of Sii island for  $1\frac{1}{4}$  miles, or until Ras Mundini pillar bears E.  $\frac{3}{4}$  S.; then S.W. by W.  $\frac{1}{4}$  W., between Sii island reef and Howard rocks, until the south extreme of Sii island bears N. by W., when the vessel will be southward of Sii island reef, and may steer N.W. by W.  $\frac{1}{2}$  W. for the anchorage off Vanga. See Vanga town, p. 74.

**Anchorage.**—There is anchorage off Vanga and the Yimbo river, in 6 fathoms, sand and shells, with the mouth of the Yimbo N.W. by W.  $\frac{3}{4}$  W., and the west end of Sii island N.E.  $\frac{3}{4}$  N.

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**Vanga and Wasin from south-eastward.**—The only safe route at present to reach Vanga is through the Wasin channel, described above. There is evidently a passage southward of Mwamba Midira and the other reefs southward of Wasin island, but as these waters have only been partially surveyed, a safe passage must depend on a sharp look-out aloft, and the sun in a good position for seeing the reefs. H.M.S. *Stork* used this passage in the following manner:—From a position well seaward and northward of the South Head reefs, steer in with Ras Mkadini W.  $\frac{3}{4}$  N. on with Kiluli summit, until Jombo hill is open westward of Sii island N.  $\frac{1}{2}$  W., when, at low water, the reefs will usually be seen; thence haul N.N.W.  $\frac{3}{4}$  W. between Bunjun and Midira reefs, until the west end of Sii bears N.  $\frac{3}{4}$  E., then, if bound to Vanga, steer N. by W.  $\frac{1}{2}$  W. past Minyani reefs for the anchorage in 6 fathoms, sand and shells, with the mouth of the Yimbo river N.W. by W.  $\frac{3}{4}$  W. and the west end of Sii N.E.  $\frac{3}{4}$  N., as before stated.

If bound to Wasin, when the west end of Sii island bears N.  $\frac{3}{4}$  E., as before, steer for it until the clump of trees between Ras Kiromo and Mgomani bears N.E.; steer on this bearing until the south-west extreme of Sii island bears N.W.  $\frac{1}{2}$  N., when, to avoid its fringing reef, borrow a point to the eastward until the Wasin channel opens, when you will be northward of Howard rocks and may steer E. by N., approaching the northern shore until the north-east point of Wasin island bears E. by S.  $\frac{3}{4}$  S., when steer in mid-channel until the anchorage off Wasin village is reached, avoiding the patch of  $3\frac{3}{4}$  fathoms situated with Ras Mundini white pillar, the north-west extreme of Wasin island, bearing S.E.  $\frac{1}{2}$  E. about 8 cables. (*See Anchorage, p. 77.*)

If proceeding through Wasin channel to sea, keep in mid-channel until abreast Shungilanzi, when close Ras Wasin, to avoid the Stork patch, which will have been passed when Ras ya Waga bears northward of N. by E., or the whole of Pungutiayu island is open to the eastward of Pungutiachi islets. A course East will then take you northward of Ship shoals into deep water and into the strength of the current. A good mark for this channel and for clearing Stork patch, but requiring to be looked for from aloft, is the north end of Sii island, open northward of Ras Mundini W.  $\frac{3}{4}$  N.

Ras Mundini open of Ras Wasin is also apparently a good mark for entering or leaving Wasin channel.

**FUNZI BAY.—Ras Kanda.**—At  $4\frac{1}{2}$  miles north-east of Ras Wasin is Ras Kanda, on which is a prominent clump of trees 126 feet high, which at first make as an island: between, lies Funzi

bay, mangrove-lined and reef-fringed with a sandy beach off the river Mamoja, and swamps in its north-west part between the above and the Uvinji river to the eastward of it; both of these rivers are unimportant. A large portion of the bay is taken up by the Mdua reefs, uncovering one to 2 feet at low water, and Mkame uncovering 3 feet, having a good channel between them which leads to a protected  $4\frac{1}{2}$ -fathom anchorage, with sandy bottom north of Mdua reef; inshore of this latter is a sand cay that dries 3 feet. pp. 403-416.

There is also a 2-fathoms channel in the Vikuarani river to the small craft anchorage off Funzi village in the north-east part of the bay, but it is not recommended, as the space is very confined and the tides run with considerable strength.

/ During flood tide there is considerable indraught into Funzi bay.

**Funzi village** contains about 150 inhabitants, the neighbourhood being sparsely cultivated and provisions obtainable in small quantities.

**Directions.—Anchorage.**—In Funzi bay a good anchorage will be found by steering in with Kiruki, open westward of some casuarina trees on the east side of Mamoja river, N.W. by N. northerly; this leads in mid-channel between Mdua and Mkame reefs, the latter of which usually breaks. Bring up in 4 fathoms, sand, with the two conspicuous fir trees on Pungutiachi just open of Ras Raschid.

**Gaze bay.**—From Ras Kanda to Chale island, distant  $9\frac{1}{2}$  miles, the coast is rocky and reef-fringed, with the long beach of Sambweni midway, and Gaze bay formed by Chale island at the northern end. Amid the cocoanuts on the shore there are several small collections of huts inhabited by the people who formerly occupied Gaze at the mouth of the river of the same name at the head of the bay.

**The WIMBI REEFS**, the last sign of the barrier reef this side of Mombasa, are broken up into four, with depths of less than 6 feet, and shallow ground seaward of the two northern; the passages between these reefs should not be taken, but inside them is a good channel along the land with a wide entrance from the northward between the Wimbi reefs and Chale island reef.

**Chale island.—Anchorage.**—Chale island, with its tree tops at an elevation of 60 feet, is a prominent feature hereabouts: the reef on which it stands stretches  $2\frac{1}{4}$  miles southward of Chale point and dries 4 feet in places, with several heads of 3 and 4 fathoms off-lying it. Between this reef and the mainland is very

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good anchorage in 5 and 6 fathoms, mud, with Chale island cast extreme about N.E. and a prominent clump of casuarina trees on the shore W.  $\frac{3}{4}$  S.

**Within Wimbi reefs.—Directions.**—A vessel from the northward desiring to avoid the current, is recommended to take the passage south of Chale island reef, which brings her along the coast inside Wimbi reefs. To enter, when nearly 3 miles southward of Chale island, steer in with the summit of Jombo bearing W. by N.  $\frac{3}{4}$  N., well open to the northward of a conspicuous clump of casuarina trees on the foreshore, until the clump on Ras Kanda bears S.W.  $\frac{3}{4}$  S., when steer for it until the 322-feet thickly wooded coast range is abeam; then alter course to S.S.W.  $\frac{1}{4}$  W. to clear the elbow of Sambweni reef.

**COAST.—Reef.**—From Chala point the coast, generally low, trends N.E. by N. nearly straight to Mombasa; it is wooded with overhanging cliffy coral points and sand beaches. For about 12 miles northward of Chala point it is fronted by a reef, extending from half to three-quarters of a mile from the shore, with a narrow passage for boats inside. From thence to Black Cliff point the reef fringes the shore at a distance of a quarter to half a mile.\*

**Black Cliff point**,  $16\frac{1}{2}$  miles northward of Chala point, projects but slightly, but is rendered conspicuous by its black cliffs and clump of pandanus, 108 feet in height, over them.

From Black Cliff point to Ras Muaka Singe entrance to Mombasa, the reef gradually extends from the shore, being one mile off at the latter point, where it is known as Andromache reef (page 84). There is a blind passage for boats inside the reef from the northward, to within one mile of Black Cliff point.

There are apparently no dangers outside the line of coast reef, which is steep-to, and may generally be seen by its breakers.

Vessels proceeding southward during the South-west monsoon period will avoid the strength of the current by keeping within half a mile of the edge of the reef, but a good look-out from aloft must be kept.

**Current.**—The current sets frequently in towards the land northward of Chala point. In January 1890, off Black Cliff point, it was found on one occasion setting W.N.W. at the rate of  $1\frac{1}{2}$  knots an hour. The usual current runs north-eastward, about one knot in the north-east monsoon period, and about 3 knots during the south-west monsoon.

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\* See Admiralty chart, Africa East coast, sheet X., No. 664.

**LANDMARKS.**—**Shimba range** is a range of mountains 10 to 12 miles from the coast, and extending from 7 miles northward of Chala point for 15 miles, the highest point being 1,406 feet in height. On the southern shoulder of the range is a conspicuous tree, which is not visible however when bearing northward of West. On the northern shoulder of the Shimba range, at an elevation of 1,177 feet, is a remarkable square clump of trees; a little northward of this clump there is a sharp fall, with a conspicuous gap (Mombasa gap) between it and a separate flat range to the northward 990 feet high.

There is a dip in the centre of the northern flat range, with a cluster of trees in it.

**Mombasa gap** is seen open when bearing northward of West, and is a conspicuous mark for making Mombasa from northward and eastward.

Between Shimba range and the coast, 3 to 4 miles inland, is a range of hills about 400 feet high. On this range, 12 miles north of Chala point, and at an elevation of 368 feet, is a conspicuous square clump of trees; and  $1\frac{3}{4}$  miles farther northward, another clump somewhat similar in appearance, but not so conspicuous.

At  $3\frac{1}{2}$  miles N.W. by W. of black Cliff point, on the coast range, is a remarkable double bushy clump of trees 453 feet high; half a mile farther northward, on a separate summit 446 feet high, is a cluster of about 10 palms.

**Coroa Mombasa.**—The hummocks of Mombasa or Coroa Mombasa, are three low but remarkable hillocks situated 5 miles northward of the port of Mombasa, the centre, which has an elevation of about 450 feet, being the highest, the others being 365 feet; they are most remarkable when seen from the eastward, as they then appear close together; they are the best indication of the situation of Mombasa island, as the land near the sea (from 40 to 70 feet in height) is about the same height as the island itself, and the latter is consequently not easily distinguishable.

**MOMBASA ISLAND** (native name Mvita) has the small harbour of port Tudor to the north, within it, and the fine anchorage of Kilindini and port Reitz to the westward; it is 3 miles in length, north and south, by 2 miles in breadth, having a level surface 40 to 60 feet in height, and a steep shore all round, perpendicular in places. Speaking generally, there is deep water close into it, except on the north and north-west sides, there being at the latter a ford to the mainland passable at low-water springs.\*

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416.

Owen justly compares this island to a huge castle encircled by a moat. It is tongued into a break in the coast between the rivers Doruma or Nash from the west, and Jumu or Barrette from the north and north-west, whence they discharge themselves into the sea. On either side of the entrance are the Andromache and Leven reefs, large outgrowths of coral reef with off-lying shallows; but the channel in is straight, with not less than  $5\frac{1}{2}$  fathoms water. The fairway is marked by two pillars in line.

**The currents** off the coast are the same as on page 80; the tides at springs run strong, the ebb being at the rate of 3 knots through port Mombasa, and as much as four knots through Kilindini.

**The winds** experienced at Kilifi and at Mombasa for the latter part of 1888, were as follows:—

	S.W.	S.	S.E.	E.	N.E.	N.	N.W.	Calm or variable.
September...	2	6	13	2	—	—	—	7
October ...	3	6	16	—	—	—	—	6
November...	3	4	14	1	3	3	2	—
December ..	—	—	7	4	10	—	4	6

From the foregoing it will be seen that south-easterly breezes are very prevalent in these months, with a tendency to haul to the eastward and north-eastward in December. The wind sets in daily about 10 a.m., and lasts fresh till sundown, when it hauls to the northward, and moderates to a light land wind during the night and early morning; it is generally steadiest between 6 and 8 a.m., which is therefore a suitable time for going out under sail. The southerly monsoon blows right in the entrance. The day breezes of either monsoon lead in.

As at Wasin and Kilifi there is a considerable greater range of temperature than at Zanzibar, and thus these places are far more healthy in comparison.

**The town and fort** of Mombasa are on the eastern side of the island. The fort is large, of indented quadrangular form, and built on a massive portion of rock, elevated some 30 feet above that which forms the surface of the island; the rock is cut down all round, forming a deep broad moat, the masonry above rising as a continuation of the rock. The entrance looks west from the indent on the north side, and projects over the moat, producing with its

sculptured stonework an imposing effect; it is of more modern construction than the rest, having been built when the other parts were renovated in 1635. pp. 403-416.

**Pier.**—A landing pier of iron, 26 yards in length, has been constructed at about half a cable northward of the south-eastern Mosque.

**A mooring buoy** lies with Ras Kidomoni bearing E.N.E., about  $1\frac{1}{2}$  cables. The buoy and pier belong to the East Africa Company.

**Telegraph.—Railway.**—Mombasa is connected with Zanzibar by submarine cable; thence, to other parts of the world. There is a land line to Malindi, p. 96; it crosses Mombasa harbour between Ras Kiberamini and Ras Kisaoni. The inauguration of the British East Africa Equatorial Railway took place at Mombasa on 26th August, 1890; about 10 miles were laid in that year. The terminus is situated at Ras Mchangamwe on the north side of Port Reitz, on the mainland.\* An air telephone wire crosses to Mombasa from abreast it.

The observation spot on Ras Kidomoni, opposite Mombasa town is in lat.  $4^{\circ} 1' 21''$  S.; long.  $39^{\circ} 41' 15''$  E.

**Population.—Trade.**—The inhabitants, some 5,000 to 6,000 in number, comprise Swahilis and representatives from many inland tribes, with a few Arabs and British-Indian subjects, these two latter being less than a tenth of the whole. It is a flourishing port, and does a large trade with Zanzibar on one hand, and Bombay on the other; the large dhows from the latter trading according to the monsoons, and bringing over rice, gampti (shirting), kaniki, ironware, and coloured cloths of various kinds.

The imports from Europe consist of white and grey shirtings, coloured handkerchiefs and scarves, printed cambrics, broadcloth, iron, brass, and copper wire, beads of different kinds, knives, iron-ware, arms and ammunition.

From America, kerosine oil, sheeting, drill, soap, &c. From Aden, salt fish and coffee—the whole roughly estimated at £40,000.

The exports are ivory, india-rubber, gum (copal), cowhides, rhinoceros horns and hides, hippopotamus teeth, copral, orchilla weed, tortoiseshell, indian corn, matama ghee, cattle and goats, roughly estimated at the same value as the imports.

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\* "Times," August 28th, 1890.

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+16.

**Supplies.**—Cattle and vegetables, also fresh bread can be obtained, and fowls and fruit are abundant. Water can be got from the well under Leven House (Mission) and also from the well at Kisaoni, but only in small quantities.

**Aspect.**—The entrance to Mombasa is indicated by reference to the Coroa Mombasa (page 81), and from the southward by the fort and its flagstaff whose truck is 150 feet high. On nearing the land, the sandy beach south of the port indicates the position of Ras Muaka Singe, 8 cables, north, north-eastward of which, on Ras Serani are the leading marks, black and white horizontally-striped pillars about 15 feet in height. Close eastward of the outer pillar is an old battery and a ruined keep; the battery has been whitewashed to give it prominence. Further assistance in picking up the position is rendered by a small ruined battery on Ras Mzrimli, 4 cables northward of Ras Muaka Singe; the ruin has been whitewashed.

**Reefs in approach.**—Eastward of Ras Muaka Singe the Andromache reef extends for 4 cables, and patches of shoal ground on which there is less than 3 fathoms, for 5 cables beyond with deep water between. A rocky patch of  $2\frac{1}{4}$  fathoms, three-quarters of a mile east of Ras Muaka Singe, must be kept in mind; there is always a heave on it. Ten feet water is marked in that direction, 9 cables from the point, on the old chart, but four several days searching at low water did not reveal it to H.M.S. *Stork*. Half a mile south-east of these are several patches with  $3\frac{3}{4}$  fathoms, rock, two cables in extent; and  $1\frac{1}{2}$  miles easterly of Ras Muaka Singe, and half a cable south of the leading mark, is a 5-fathom small head of rock. A patch of 4 fathoms is situated  $1\frac{1}{2}$  cables northward of the leading mark, about  $2\frac{1}{4}$  cables from the 5-fathom head; see the plan for other possible dangers.

On the northern side of the entrance are the Leven reefs, which are not so steep-to as the Andromache, the 5-fathom line lying more than three cables off the western portion of their edge and 8 cables south-west of the outer or eastern edge of that reef. Within the reef is a sandy beach with George rock (12 feet) at the inner and western end, and the small bluff of Ras Kunwongbe, 70 feet in height, at the other. Thence the coast trends north-easterly for 3 miles to Ras Iwa Tine, composed of sandy beaches and a narrow fringing reef with a dhow and boat channel inside the Leven reefs, which latter trends parallel to the coast, and with its inner edge 5 to 3 cables distant.

The outer anchorage is in about 10 fathoms, sand and coral, with Ras Iwa Tine just open of Ras Kunwongbe N.E., and the outer leading mark pillar N.W. by W.  $\frac{1}{2}$  W. It is very indifferent, there being always a heave which, during the south-west monsoon, is considerable. pp. 403-416.

Between Ras Muaka Singe and Mzimili is the entrance to the port Kilindini and Port Reitz. (Referred to on p. 87.)

**PORT MOMBASA** is an inlet 2 cables in width and one mile in length on the east side of the island, and with good anchoring depths in most places close to the shore, and depths of not less than 5 fathoms in the fairway of the approach. Off Ras Serani the fringing reef is not steep-to and should be given a berth of three-quarters of a cable; the coast is clifty and trends northward from Ras Serani past Ras Mitani to the fort and town, where, abreast the Mosque, and the Custom House, it forms a small point, the foul ground off which must be avoided. Hence it trends away north-west and thence forms with Ras Kiberamini three-quarters of a mile to the northward, a bight half filled with reef and useless for anchorage purposes.

On the other side of the inlet, Mackenzie point, 3 cables W.N.W. of George rock is 25 feet in height, the reef and shallow water extending out into the channel from both, and narrowing the entrance channel, which is close over to Ras Serani, to one cable in width between the 5-fathom lines. Half a mile above Mackenzie point is Ras Kidomoni or English point (the Observation spot), 10 feet high at the point, and rapidly rising behind to 40 feet. There is bold water close into the point. Thence extend cliffs 40 feet high for three-quarters of a mile to the pool at the head of the anchorage—north of which lies Kisaoni, a large and thriving Mission Station; the Flagstaff of which at the western end of the Settlement forms with the pillar on Ras Kiberamini the leading mark up the channel.

A small coral spit extends about half a cable south-eastward from below the Kisaoni flagstaff.

**Beacons.**—On Ras Serani are two beacons, painted black and white in horizontal stripes, about 15 feet in height; these in line mark the fairway from seaward. It is intended to exhibit a light from this point. On Ras Kiberamini, within the harbour, is a black and white horizontally-striped stone pillar 15 feet high, one of the marks for leading up the channel.

**Anchorage.**—There is good anchorage off the town in 7 fathoms sand and shells, just to the westward of the leading mark, and with

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English point N.E.; also in 10 to 12 fathoms in the pool off the Kisaoni Mission Station, but in either place vessels are recommended to moor. The holding ground is good but the tides are strong, especially the ebb; and when the sea breeze sets in strong, vessels swing broadside on between wind and tide, which occasionally brings a heavy jerk on the cable. Strangers should come in on the ebb and large vessels at high-water, or the first of the ebb.

**A rifle range** has been established by H.M.S. *Conquest*, at English point, 600 yards range.

**Tides.**—It is high water, full and change, at 4h., springs rise 11 feet, neaps  $8\frac{1}{2}$  feet. The ebb and flood are about equal, and run at the rate of about  $2\frac{1}{2}$  knots at springs.

**Directions for Mombasa.**—A vessel from the southward should skirt the Andromache reef at about a mile, and if of heavy draught should make towards the outer edge of the Leven reef until she brings the pillars on Ras Serani in line N.W.  $\frac{3}{4}$  W., to avoid the 5-fathom patch, situated half a cable southward of the leading mark, when she may proceed in on that bearing. These pillars are not always made out without the aid of a glass; in the forenoon they are distinct and have been seen 5 miles, but they are shaded in the afternoon; the whitewashed battery on the point just eastward of them best denotes their positions.

A vessel from the eastward should bring the flagstaff on the fort N.W.  $\frac{1}{2}$  N. until the pillars can be seen; and, if from the northward, skirt the Leven reefs at half a mile distance, but should not haul round until the flagstaff or pillars be brought on the above bearings, when proceed in as before.

The tidal streams meet off Ras Serani, requiring at springs the greatest attention to be paid to the steering, especially going in on the ebb, when the race will take the vessel first on one bow and then on the other. When Ras Iwa Tine is about to be shut in by Ras Kunwongbe, look out to pick up the flagstaff at the west end of the Mission Station at Kisaoni, and alter course in good time to bring it in line with the pillar on Kiberamini, bearing N.  $\frac{1}{2}$  W., which mark leads in the fairway of the entrance (only one cable wide between the 5-fathom lines at low water), and up towards the anchorage.

When nearing Ras Mitani a vessel should borrow to the eastward of the mark as the channel then becomes wider and to avoid the reef projecting there, and also higher up off the town on to which there is a decided set, and at times a small race. Anchor as before

directed if there is a berth, p. 85, but if necessary to go farther on a vessel should endeavour to anchor below the rock, which dries 11 feet on the western flats, off which the water is from 16 to 18 fathoms in depth. pp. 403-416

**Port Tudor.**—From the head of port Mombasa a narrow and winding but deep channel communicates with Port Tudor a fine land-locked harbour on the north side of the island. There are few more beautiful places than this winding channel with its steep wooded banks, but the passage is impracticable for a sailing ship on account of its windings, but quite easy for a steamer keeping in mid-channel. The two points on the eastern side of the passage Ras Kisaoni and Junda are fringed with reef or foul ground to the distance of half a cable; after passing these, when entering Port Tudor, a berth increasing to  $1\frac{1}{2}$  cables must be given to Kwamwana Ina, the north extreme of Mombasa island, to avoid the reef extending nearly that distance from it. Vessels cannot proceed above the telegraph (air) line across the harbour abreast Ras Kisaoni.

The anchorage is in 7 fathoms, mud, in its eastern part with Makame Jiwe Ras, just open of Ras Junda, and the points of Makupa channel to the south-west (a boat channel leading to port Reitz) just beginning to open. The remainder of the harbour is spoiled by the extensive flats that limit the anchorage ground. There are several channels through these flats, that to the north leading to the Jumvu river, which at high water may be ascended for several miles and towards the head of which is the large Mission Settlement of Rabai.

**KILINDINI AND PORT REITZ.**—Kilindini, which means “in the deeps” is the name given to the channel and fine sheltered harbour to which it leads south-west of Mombasa island, which is available for all classes of vessels. Within it, and to the west of the island is an equally good anchorage in 7 to 14 fathoms, over one mile in length, with less depths farther in, in the eastern part of port Reitz; its western part, like port Tudor, is composed of flats and shallow water except in the small channel to the Doruma river.

The channel  $3\frac{1}{2}$  miles long varies from  $1\frac{1}{2}$  cables wide at the entrance to 7 cables in port Kilindini, but this latter portion is encroached upon by Buchanan rock, awash at low water, and the Kilindini reefs, about 2 cables in extent, which dry at low water springs. It sweeps gradually round from a south-west to a north-west direction, the banks on either side being high, part bush and tree covered and part cultivated, with a small but shallow inlet on either side, Mbaraki to the north and Mueza to the south.

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**Directions.—Beacons.**—The entrance is well marked with two whitewashed leading pillars 12 feet high, on the south bank, which, (having come in from seaward with the leading mark pillars on Ras Serani in line N.W.  $\frac{3}{8}$  W. as for Mombasa, p. 86) should be steered for when in line, bearing S.W. by W.  $\frac{7}{8}$  W.

When abreast of Ras Muaka Singe, Ras Bofu one mile farther up on the south bank will be seen to open of Ras Mbuyuni, the point on the north side within Mzimili, when alter course towards it and keep mid-channel until the 12 feet beacon on the rock 6 feet high, opposite Ras Kilindini is seen, when steer for it on a N.W.  $\frac{1}{4}$  N. bearing,\* which leads northward of Buchanan and Kilindini reefs; when Shamanzi the north-western point of Mombasa island is well open of Ras Kilindini, alter course to the northward keeping in mid channel until abreast Ras Kilindini, thence rather towards Mombasa island into port Reitz.

**Anchorage.**—There is anchorage in port Reitz (Banderia Kipevu) in 12 to 15 fathoms, mud, with Ras Kigangone S.E. by E. 4 cables distant. A vessel anchoring in port Kilindini for the night, or for shelter, will find a good berth in 12 fathoms, mud, off Mbaraki creek, a much preferable anchorage to lying in Mombasa outer anchorage.

Eleven men of war anchored in port Reitz in February 1890.

**COAST.**—From Mombasa to Kilifi the coast trends N.E. by N. with sand beaches and overhanging cliffy coral points. It is fronted by a reef extending from half to three-quarters of a mile from the shore, to a distance of 12 miles north of Matapwa river, with a passage for canoes inside. That portion between Mombasa and Matapwa is known as the Leven reefs, before mentioned. From 12 miles north of Matapwa to point Senawe, the coast is steep-to, with overhanging coral cliffs about 15 feet high. On the top of this cliff, and 15 miles north of Matapwa is a conspicuous white sand patch.†

There appears to be no lying-off dangers until the reefs off Kilifi are reached. The coast reef is steep-to and nearly always breaks.

**Current.**—The current runs strongly to the northward off the coast; but is less in shore near the reef.

**Matapwa river.**—There is a passage through the reef to the entrance of the Matapwa river, and at least a depth of  $3\frac{1}{2}$  fathoms can be carried into the river in which there is deep water, but the channel is rather intricate. Were the river to be made use of at any time, a more thorough examination would be required.

\* Another beacon has been placed on the shore, on the same line of bearing, but it is too close to the other to be of much use as a leading mark. H.M.S. *Raccoon*, 1891.

† See Admiralty chart, No. 1390.

**Rabai range**, about 8 miles from the coast, has five distinct summits, the northern 1,087 feet, being the highest. The southern summit Rabai hill upon which is the Mission Station, is 985 feet high. Between Rabai range and the coast the country is undulating and wooded. The Coroa Mombasa, seaward of the Rabai, is described on p. 81. pp. 403-416.

**Senawe range**.—North of the Rabai range, and separated from it by a low hill, is the Senawe range, the southern peak of which is 1,152 feet high, and rendered conspicuous by a group of tall palms on its summit. Between the northern peak, 1,025 feet, and a hill 978 feet in height, is Kilifi gap.

**Coast range**.—Three to four miles north of Matapwa, a coast range commences which is 400 to 500 feet high, with thickly wooded country between it and the coast. At the south end are two peaks, the southern 509 feet high, may be recognised by a bushy clump of trees on its summit. Farther along the range, on another peak is a round clump of trees, also conspicuous; and on the northern slope there are three conspicuous single trees. The coast range ceases at about 3 miles southward of Takaungu.

**TAKAUNGU RIVER.**\*—Between Blowing point and the Takaungu river one mile northward of it, the coast is bluff, and some 40 to 50 feet high, with a bright sandy beach 2 cables long (one of the recognising features) just south of the entrance to the river. The latter is half a cable wide and runs at high water between rocky bluffs, but at low water the bed is confined to a narrow channel at the side of the northern bluff, all the rest of the bed uncovering. At low water springs the *Stork's* steam cutter entered with much difficulty—the bottom being rocky with several projecting heads. It is navigated by the dhows at near high water; but the tides run swiftly, and there is considerable bubble and disturbance between the entrance and the town. After winding some  $1\frac{1}{2}$  miles inland it is lost in large mangrove swamps.

**Takaungu**, a large and walled town, is situated in a grove of cocoa-nuts on the south bank half a mile from the entrance, and is the principal town on the coast between Mombasa and Malindi. It boasts a fort in charge of an Akhida (Captain) and 30 soldiers, and a varying population of 1,500 to 2,000. It has several mosques and some 300 to 400 houses and huts, with numerous wells, and is a thriving place. The surrounding country is well cultivated, there being a large number of farms in the neighbourhood, whence much grain is raised and exported.

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\* See Admiralty plan of Kilifi river, No. 238.

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**Trade.—Supplies.**—Meat is obtainable here, and fowls, eggs, and vegetables are abundant. There are several Indian traders, but it is not such a centre for copra, hides, and ivory as Mombasa. There is a ferry across the river to the main coast road that leads to the northward.

**Mbogolo hill**, 250 feet high, rises out of the plain, some 2 miles south-west of the town, and is quoin-shaped, with the fall to the northward : this shoulder, on with the southern side of the bluff near the river entrance, forms a fine mark for leading through the Takaungu pass in the reefs.

**KILIFI APPROACH.**—From Pinnacle point, on the north side of the Takaungu river, to Ras Kitoka, the coast trends northerly for 2 miles to the mouth of Kilifi river : it is rock-bound and reef-fringed, the cliffs being between 40 and 60 feet high, with two small sandy beaches in its southern part, and the leading mark pillars 14 feet high, rather more than half way along, standing on the top of the cliffs 44 feet above high water.

**Ras Kitoka**, 57 feet in height, forms the southern side of the mouth of the Kilifi river, the northern side being an abrupt rise to the same height and then a continued but gradual rise at the back, on which is situated the small village of Kioni. In front of the eastern huts of the village is a beacon composed of a pole rove through three casks and surmounted by a diamond painted white, the whole being 15 feet in height and standing 70 feet above high water ; this beacon in line with the trunk of a large whitewashed cotton tree below, whose top and limbs have been lopped off, leads up between the reefs from the roadstead to the mouth of the river.

**KILIFI RIVER**, with 15 and 30 fathoms in mid-channel, is sinuous, one and a half miles in length and one and a half cables wide, leading to a large basin of Bandaria ya Wali. It lies between cliffs 70 to 100 feet high which have a small fringing reef to them, of slight extent everywhere except a spit that extends one cable northward from Ras Kitoka on the south side, and another one from the north side near the Custom house, and the ferry which plies across from the sandy beach close under and west of Ras Kitoka, near which beach is situated the village of Kilifi of about 70 inhabitants (fishermen and ferrymen), and a small dhow building yard.

**Mnarani**, the principal village, is on the table land above a small plain one mile from the entrance and on the southern side of the river just before its last bend. It has a scattered population of

300 people, mostly engaged in agriculture, from whom small supplies of fowls and vegetables and an occasional bullock can be obtained. The old town of Kilifi, the ruins of whose mosques are still visible, was situated above and to the westward of the plain. pp. 403-416.

Whilst this district has come to be referred to by Europeans as Kilifi because of the anchorage afforded by that river and its inner basin, it is more readily known to the natives as that of Takaungu.

**The best anchorage** in the river is off the plain in 12 fathoms, mud, with the Custom house point well open of the southern side of the river E. by S., and the western side of the plain under Mnarani S.  $\frac{1}{2}$  W. A large vessel must moor, unless she anchors in the middle of the channel, in 15 to 20 fathoms.

**Telegraph.**—An air line, between Mombasa and Malindi crosses Kilifi harbour, eastward of Mnanari village. Vessels cannot proceed above it.

**Banderia ya Wali** is  $1\frac{1}{2}$  miles across with good anchorage in 9 fathoms, mud, in its eastern part, with Ras Ncoma S.E. and Ras ya Wali S.W. The foreshores are reef and mangrove lined, and rise gradually on all sides. The northern and western sides of this fine basin are completely choked with reefs and mud flats. In its north-western part is the populous village of Kibokoni on the northern bank of the mouth of the Mtanganyiko or Konjoro, a narrow river, with one foot water in its entrance but deep within, which bifurcates some 2 miles up, and leads to the grain-growing centres of the same names, Konjoro to the northward one mile, and Mtanganyiko the same distance to the west.

**Reefs in the approach.**—The off-lying reefs named South, Middle, and North are nowhere dry, but a few heads are occasionally visible at low water springs on the Middle reef. In the N.E. monsoon (and especially at high water) they are not nearly so prominent as during the S.W. monsoon, when they always break, and at times to such an extent after heavy weather that no signs are visible of the channels between them.

**Passages.**—There are three passages between the reefs, namely : the Dhow passage between Blowing point and the Southern reef, to which the diamond topped beacon at entrance to Kilifi river in line with the outer leading mark Pillar southward of it leads ; this is a lumpy channel but used by dhows and light-draught vessels.

The Takaungu pass, one and one-third cables wide between the Southern and Middle reefs, the leading mark for which is Mbogolo

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hill shoulder tip W. by S.  $\frac{1}{2}$  S. in line with the bluff on the southern side of the Takaungu river; this pass carries 15 fathoms until within the reefs.

The northern pass, one mile northward of the Takaungu pass, leads direct on to the coast and has a depth of 7 fathoms, but is only half a cable broad, through which the leading mark Pillars in line bearing W. by N. lead. The erection of the second pillar, in rear of the 14-foot pillar, giving a definite leading mark, renders this channel the safest to take.

The North reef is continuous past the mouth of the Kilifi river, but breaks up to the northward; within it is another series of reefs which much hamper the approach to the Kilifi river, leaving a channel only one cable wide, through which the whitewashed tree N. by W.  $\frac{7}{8}$  W. on with the diamond beacon leads. Attention must be paid to the set of the tides in taking this channel: the flood setting northerly across the reefs until well up to the river mouth; and the ebb setting straight out across the reefs.

**Tides.**—It is high water, full and change, at 4h., springs rise 12 feet, neaps 8 feet.

**DIRECTIONS.**—**Takaungu pass.**—Steer in with the summit of Mbogolo hill, in line with the bluff on the south side of Takaungu river W. by S.  $\frac{1}{2}$  S., until the diamond beacon is well open westward of the whitewashed tree below it, when alter course to starboard, either for the anchorage in 6 fathoms, sand, with Pinnacle point W.S.W. and the outer leading pillar for North pass N. by W.  $\frac{1}{4}$  W., or for the northern end of the roadstead.

**For the Northern pass** bring the leading mark pillars in line to bearing W. by N., and steer for them.

When within the reefs, anchorage will be found in 9 fathoms, sand, with the outer pillar W.  $\frac{1}{4}$  N. and Ras Kitoka N.W.  $\frac{1}{2}$  N.; but there is always a considerable ground swell in this outer anchorage.

**To proceed into the river,** from the anchorages above mentioned, a small ship may keep the diamond beacon on with the whitewashed tree N. by W.  $\frac{7}{8}$  W.; but a large vessel should, after passing the leading mark pillars, borrow slightly to the land side of that leading mark, until she is half-way to Ras Kitoka, to avoid the south-west corner of the inner North reef; and then borrow slightly on the other side of the line to avoid the foul ground extending eastward of Ras Kitoka. When Ras Ncoma comes in line with the point eastward of it on the northern side of the river, haul into the river, in mid-channel; Ras Ncoma open of the

point on the northern side, leads southward of the reef off the Custom-house point under Kioni. Anchor off Mnarani, or in Bandara ya Wali, as convenient. *See* p. 91. pp. 403-416.

**Caution.**—In taking these passes or channels great care must be taken of the tides, which set directly across the passes and obliquely across the channel, flood to northward and ebb to south-eastward and south.

**COAST.**—From Kilifi to Owyombo the coast trends northward with similar sand beaches, and overhanging coral cliffs, as to the southward, and is fringed with a reef to a distance of half to three-quarters of a mile from shore. The coast is lined with thick scrub and bushes 15 to 20 feet high.

**Sand patch and clump.**—About mid-way between Kilifi and Owyombo there is a very conspicuous sand patch with a high clump of casuarina trees over it. This is a very good mark, and shows conspicuously from both north and south. Between it and the village of Wasa, to the southward, there are some red sand cliffs.

**White Sand hill.**—Just south of the Owyombo river, and on the coast, is a conspicuous white sand hill 25 feet high, and at the mouth of the river on the south bank is a remarkable hummock 131 feet high, steep on its southern side, but sloping on its northern.

**Owyombo river** is of no practical use for navigation, except for canoes. Dhows, however, anchor inside the island at the entrance.

In the centre of the entrance to the Owyombo there is an island 45 feet high. On the northern bank of the river entrance there are patches of red sand cliff.

**Hills.**—Between Kalifi and Owyombo, and about 5 miles from the coast, there is a range of hills 600 to 800 feet high, but flat and without any defined summit.

**Mangea mountain** is 1,776 feet in height, and situated 15 to 20 miles from the coast; it has a fairly well defined summit, the sides sloping gradually, and standing alone it makes a good land mark for the coast, should the weather be clear enough for it to be seen.

**COAST.**—From the Owyombo the coast trends east-north-eastward to Malindi point, fronted by a coral reef, which gradually extends from the shore southward of the cape.

**Islets.—Landmarks.**—Three miles northward of the Owyombo are six islets, 50 to 100 feet high, and close to the shore; these are backed by a sand beach, which gives them the appearance of being

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cliffy points. The village of Watamu lies behind them. Off these islands the bottom is rocky and uneven for a distance of one mile.

Just south of Malindi point are two long sand beaches, which are conspicuous by the double black coral points which separate them.

**MALINDI APPROACHES.\***—Malindi point or cape is a cliffy, coral, rounded point, 20 feet high, but is rendered noticeable by the Sail rock just off it.

**Sail rock** is 21 feet high, and resembles a sail when seen clear of the point. This rock was whitewashed by H.M.S. *Stork* in November 1889.

**Malindi reef**, off Malindi point, extends to a distance of  $1\frac{1}{2}$  miles from the shore ; it dries about 3 feet in places and generally breaks. There is a good passage within the reef, used by the dhows.

**Malindi bank** extends from 4 miles east, to 7 to 8 miles south of Malindi point, with depths of 4 to 8 fathoms. It is steep-to on its outer edge, gradually deepening to the southward. There are apparently no shallower heads, and the bottom of sand and coral can be easily seen up to a depth of 8 fathoms. There are heavy tide rips and overfalls at its edge.

**Coast.**—From Malindi point to Leopard point the coast is cliffy and wooded, 15 to 20 feet high. There is an off-lying rock 12 feet high, half a mile south of Leopard point, but is not easily distinguished till close in.

**Leopard point** is a white sandy point, with a very conspicuous clump of casuarina trees within it.

**Quoin hill**, a wooded hill about 200 feet high, and 8 miles west-north-west from Leopard point, shows conspicuously from the eastward.

**Coast.**—Between Leopard point and Vasco da Gama's pillar there is a long stretch of sand beach, fronted by a reef, which dries in places, extending half to three-quarters of a mile from the shore.

**Vasco da Gama's pillar**, in lat.  $3^{\circ}13'21''$  S., and long.  $40^{\circ}08'00''$  E., is near the extremity of the point, which is of coral, cliffy, and perforated in two places, situated southward of Malindi town. The pillar is  $18\frac{1}{2}$  feet high, having a cross with the arms of Portugal on the top (very much weather-worn), 25 feet above high water mark.

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\* See Admiralty chart, No. 664, and port Malindi and approaches, No. 667. Add chart, No. 848, Malindi to Juba, to index chart.

The pillar was re-whitewashed by H.M.S. *Stork* in November 1889. pp. 403-416.  
 There is a small cove westward of the pillar, open to northerly winds.

**North reef**, lies from a half to one mile off Leopard point, and gives shelter from the northward to Malindi road. It has a white sand cay on it which dries 10 feet.

**Pillar reef**, is an extensive coral reef fronting the coast between Malindi road and Malindi town. Off Vasco da Gama's pillar it extends to the distance of one mile, and nearly always breaks on its northern and eastern edges.

**Leopard reef**, which protects Malindi road to the eastward, is a reef about 2 miles in length, by half a mile in width at its broadest part, and dry in places at low water; its outer edge being  $2\frac{1}{2}$  miles from the shore. On its inner edge is a sand cay which is awash at high water spring tides.

**MALINDI ROAD** is an anchorage between Malindi and Leopard points, with depths of from 4 to 7 fathoms. It is protected from northward and eastward winds by North and Leopard reefs respectively.

A coral patch, awash at low water springs, lies on east side of Malindi road, 4 cables southward of North reef, with Leopard point bearing N.W. by N. one mile.

**Directions.**—To enter Malindi road from the southward, steer in with the conspicuous clump of casuarina trees on Leopard point, in line with the summit of Single Tree hill N.  $\frac{1}{2}$  W. This will lead in with not less than  $3\frac{1}{2}$  fathoms over Malindi bank. When Sail rock shows clear of Malindi point, bearing S.W.  $\frac{1}{3}$  W., keep it astern on that bearing, and anchor in  $6\frac{1}{2}$  fathoms, sand and coral, when the clump of casuarinas within Leopard point bears N.W. by N.

**Stork passage**, the northern entrance to Malindi road, between North reef and Leopard reef, is 3 to 4 cables wide, and apparently clear of danger. North reef is generally easily seen, and the passage can be used by keeping from one to  $1\frac{1}{2}$  cables eastward of it.

**Griffon patches.**—Shoal water in patches extends from one mile eastward of the sand cay on Leopard reef for a distance of 3 miles to the northward, with depths of 3, 4, and 6 fathoms coral. These shoals include the Griffon patches. Single Tree hill, in line with the guardhouse on the north bank of the Sabaki river, N.N.W.  $\frac{2}{3}$  W., leads northward of these patches.

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**MALINDI**, situated 3 miles northward of Malindi road, derives its chief title to notice from the first voyage of Vasco da Gama, who reached as far north as this place on his way to India in 1498. He describes the town as standing on a plain, near the coast, surrounded with gardens, and consisting of houses neatly built of hewn stone, with handsome rooms and painted ceilings. It was at that time evidently a place of some importance. In 1605 the Portuguese, under Don Francisco d'Almeida, took possession of the place. In the beginning of the last century it was in possession of the Arabs, but when Captain Vidal visited the place in 1824, he found that the territories of the ancient Kingdom of Malindi were totally occupied by the Galla, a savage nation, which carried its conquests from the southern declivity of the Abyssinian Alps as far south as Malindi. On the site of the town Captain Vidal found nothing but ruins, and his opinion was that it was entirely destroyed by the Galla in their wars with the Arabs, who possessed most of the ports along this part of the coast. The town is now under the control of the Imperial British East African Company, who collect the customs and administer the government. The house of the agent, a two-storied whitewashed house, faces the sea, the company's flag being generally hoisted on a flag-staff on the roof. There is only one other house of any size in the place. This belongs to an Arab merchant; it stands back from the beach a little, is whitewashed, and has a square castellated roof. The rest of the houses in the town are small and dirty. Trade is said to be now increasing.

**Telegraph.**—Malindi is connected with Mombasa by a land line of telegraph.

**Landing.**—There is no landing pier. At low water it is necessary to wade or be carried on shore from the boat. At high water, if it is smooth, landing may be effected by a gangway board.

**Observation spot.**—The flag-staff of the British East African Company, the observation spot of H.M.S. *Stork*, is in lat.  $3^{\circ} 13' 0''$  S., long.  $40^{\circ} 7' 41''$  E.

**Patch.**—A patch, with one fathom least water, on its north end, lies N. by E.  $1\frac{1}{2}$  miles from Vasco da Gama's pillar; it breaks occasionally, but not unless there is a good deal of swell.

**Tides.**—It is high water, full and change, at Malindi at 4h. 5m., springs rise  $12\frac{1}{2}$  feet, neaps 9 feet.

**Directions.—Anchorage.**—Approaching from the southward, Mangua mountain forms a good land mark for making the coast about Malindi. On a nearer approach the most conspicuous mark

will be the white sand hill north of Sabaki river. The white two-<sup>pp. 403,</sup>  
 storied house of the British East Africa Company will then be seen <sup>416.</sup>  
 with Vasco da Gama's pillar to the southward of it. A good berth  
 having been given to Leopard reef, a vessel will be northward of  
 Griffin patches when Vasco da Gama's pillar bears westward of  
 W. by N., when course may be shaped to pass one mile northward  
 of the pillar; the Company's flagstaff may be steered for between the  
 bearings of S.W. by W. and S.W.

A good anchorage in about 5 fathoms, sand and coral, will be  
 found with the Company's flagstaff S.W. by S., and Vasco da Gama's  
 pillar in line with the clump of casuarinas on Leopard point, bearing  
 S.  $\frac{1}{3}$  W., and conspicuous bluff N.N.W.  $\frac{1}{2}$  W.

The anchorage is protected to the southward by Pillar bank, and  
 affords good shelter during the south-west monsoon period, though  
 some swell sets in. The depths decrease gradually, but it is not  
 recommended to go into less than 5 fathoms on account of the swell.

Approaching from northward, after passing Ras Gomani, the hills  
 over Mambrui will be seen; then the conspicuous white sand hill  
 north of the Sabaki river. The Company's flag-staff bearing west-  
 ward of S.W.  $\frac{1}{2}$  S. leads eastward of one-fathom patch; when anchor  
 as before recommended.

**Supplies.**—Supplies of beef, vegetables, fish, fowls and eggs, can  
 be obtained at reasonable prices. There is a market near the centre  
 of the town. There are wells of great depth and of ancient construc-  
 tion, but after a dry season water is scarce.

**Current.**—In the months of November and December off Malindi,  
 outside the reefs and within the 100-fathom line, a nearly constant  
 current setting to the southward was found, running at a rate of  
 three-quarters of a knot an hour. Outside the 100-fathom line, the  
 current sets to the northward from one to three knots an hour all  
 the year round.

**COAST.**—Between Malindi and the Sabaki river there is a long  
 stretch of sand beach, backed by a low range of sand hills.

**Conspicuous cliff.**—N. by W.  $1\frac{1}{4}$  miles from Vasco da Gama's  
 pillar there is a conspicuous dark bluff 25 feet high, which shows  
 well between the sand beaches on either side.

**Sabaki river**, situated south of Mambrui point, is shallow, and  
 of no use except for canoes. At low water it dries across the mouth,  
 which is quite blocked by rocks. The discharge from the river was  
 only checked near the mouth by the flood tide.

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416.

**Mambrui point.**—From a short distance north of the Sabaki river the land rises to a coast range, forming Mambrui point. Near the south end of the range is a conspicuous white sand hill, 145 feet high. It shows well from the south and eastward, and from the northward it is easily distinguished as soon as it opens of Mambrui point.

**A reef** which generally breaks, extends a mile or more off the point.

**Mambrui** is situated on the north side of Mambrui point and 6 miles north of Malindi. There is a conspicuous house and bushy tree near the centre of the town.

**Coast.**—From Mambrui to Ras Gomani peninsula the coast is sandy with low sand hills and bushes. The country is flat between the coast and Single Tree hill.

**RAS GOMANI** is a bold projecting peninsula of overhanging coral cliffs, with sand beaches on its southern side. Near its extreme it is 69 feet high, but the highest part, 2 miles within, is 148 feet high. There is a conspicuous sand patch on the north side of the summit 134 feet above the sea. The point is steep-to, with apparently no off-lying dangers.

**Reefs** extend from one to  $1\frac{1}{2}$  miles off the points of the bay, between Mambrui and Ras Gomani.

**Anchorage.**—Southward of Ras Gomani summit, and within the reefs, a good anchorage will be found in 5 to 6 fathoms, sand. The entrance between the reefs is two cables wide.

**Directions.**—To enter, steer in with the summit of the peninsula of Ras Gomani bearing N. by W.  $\frac{1}{2}$  W. until the east extreme of the point bears N.E. by E.  $\frac{1}{2}$  E., then haul up on that bearing and anchor as convenient. H.M.S. *Stork* anchored there in smooth water, when there was considerable swell outside.

**Single Tree hill** is a round topped hill 569 feet high, situated 7 miles north-westward of Mambrui point. It has a clump of trees on its summit, and is conspicuous from the southward. It forms, with Leopard point clump, the leading mark for entering Malindi road, and in line with the house on the north bank of the Sabaki river, clears the Griffon patches and dangers northward of Leopard reef.

p. 416.

**FORMOSA BAY.**—Line 14 from bottom. These reefs are known as Pamamba shoals.

**Tana river.**—The Tana has been navigated by the *Kenea*, a small p. 417. steamer of the East African Company as far as Baza, about 300 miles from its mouth, reaching that place on 27th June 1891. See chart, No. 848.

**Ozy reefs.**—Shallow ground is said to extend one mile south- p. 417. westward of the outer reef, rendering it advisable to give it a wide berth.

**Ozi river** had a depth of 2 feet at low water over its bar in p. 417. September 1890, at about one-third of a mile within the entrance.

**Kipini.**—The vicinity of Kipini is pointed out by a white sand p. 418. bluff, the first westward of Ozi point. There is a white beacon eastward of the bluff. The fort and village, westward of the bluff, are not conspicuous, but the flagstaff shows above the sky line. There is anchorage two miles off Kipini in 4 fathoms, with the beacon N. by E.

**Lamu bar** had a depth of 26 feet at high water in November 1890. p. 419.

Line 18, omit the word *red*.

p. 421.

Lines 19, 20, for spar beacon, with cask, *read* flagstaff.

Line 29, battery is not discernible.

Agents of the I. B. E. African Company are stationed at Lamu.

**KISIMAYU BAY.**—The pillar, reported not visible in foot- pp. 437, note, page 437, does not exist. Amend line 5 of that page; and line 6 <sup>438,</sup> from top and 4 from bottom of page 438. A light coloured pillar stands on the south-west side of Mark hill, which must not be mistaken for the above mentioned. Agents of the Imperial British East African Company are stationed here.

**Juba river** forms the boundary between the British and Italian spheres of influence.

## CHAPTER XI.

For Brava *read* Brawa.

p. 442, &c.

For Muerka or Marka *read* Merka.

p. 446, &c.

Bottom line, add p. 444.

For Magadoxa *read* Mogdishu.

p. 447, &c.

**Ras Awath** is now charted in lat. 5° 52' N., but its actual p. 451. position is uncertain. The Sultan of Oppia's territory lies between it and lat. 2° 30' N.

**Hafún South bay.**—A sand bank with a depth of 3 fathoms, is p. 445. reported by the Italian S.S. *Volta* to exist about three-quarters of a

mile off the north shore of the bay, with the south-east point of the bay S.E.  $\frac{1}{4}$  S. ; the south point of the small bay within E. by S.  $\frac{3}{4}$  S. and the west extreme of the Table land N. by W.  $\frac{1}{2}$  W.\*

## CHAPTER XII.

pp. 485, 486. **MAYOTTA.—Zamburu passage.†—Bar.**—From a recent examination, a bar has been found to exist in the approach to Zamburu passage, connecting Zamburu with north reef, thus confirming the statement made at p. 486. The bar is about half-a-mile across, with a least depth charted of 23 feet, at about a third of a mile southward of the leading mark. The depth on the leading mark is about 26 feet. Possibly less water may exist. The depths mentioned in the pilot as obtained by the *Cordelia* and *Seagull* were obtained on this bar.

Chaloupe reef is connected with the reef extending north-eastward of cape Duamuni; the buoy marking it is charted nearly a cable within its extreme, and therefore should be given a wide berth.

p. 486. **Buoyage.**—White buoys mark Chaloupe reef, the east side of Duamuni reef, a 2-fathom patch abreast Belette reef, Coq, and Prevoyante reefs. Chequered buoys mark the south-west side of Great North-east reef (abreast Chaloupe buoy), a patch of  $2\frac{1}{4}$  fathoms between it and Belette, Belette reef of  $1\frac{1}{2}$  fathoms, Lacrocheterie reef, and the south-west extreme of the southern of the three reefs eastward of point Congo. This cancels lines 14 to 22.

Bottom line, *for* 19 feet *read* 13 feet.

p. 487. Line 23 : *for* 5-fathom patch on the leading mark, *read*  $4\frac{3}{4}$ -fathom patch near the leading mark. Line 27 : *for* 5, *read*  $4\frac{3}{4}$  fathoms.

**Great Western passage.†—Shoals.**—The following patches have been found in Great Western passage :—

(1.) A shoal, extending  $6\frac{1}{2}$  cables in a north-west and south-east direction, and  $1\frac{1}{2}$  cables in breadth, with  $4\frac{1}{4}$  to  $5\frac{1}{4}$  fathoms water on it, lies with its north-west end in approximately lat.  $12^{\circ} 47' 35''$  S., long.  $44^{\circ} 59' 55''$  E.

(2.) A shoal,  $2\frac{1}{4}$  cables in diameter, with  $4\frac{1}{4}$  fathoms water on it, lies in lat.  $12^{\circ} 47' 20''$  S., long.  $45^{\circ} 0' 45''$  E.

\* See Admiralty chart :—Ras Galweni to Ras Hafún, No. 100A; from Genoa Notice to Mariners, No. 76 of 1890.

† See Admiralty chart :—Mayotta island, No. 2,741.

‡ Originally published in Notice to Mariners, No. 24 of 1892.

(3.) A shoal, about 2 cables in extent, with  $3\frac{1}{4}$  fathoms water on it, lies in approximately lat.  $12^{\circ} 47' 54''$  S., long.  $45^{\circ} 0' 40''$  E.

(4.) A shoal,  $2\frac{1}{4}$  cables in diameter, with  $4\frac{1}{4}$  fathoms water on it, lies in lat.  $12^{\circ} 48' 50''$  S., long.  $45^{\circ} 0' 45''$  E.

(5.) A shoal, extending  $3\frac{1}{4}$  cables in a north and south direction, and one cable in breadth, with about  $4\frac{1}{4}$  fathoms water on it, lies in approximately lat.  $12^{\circ} 48' 45''$  S., long.  $45^{\circ} 0' 10''$  E.

(6.) A shoal, about one cable in diameter with  $4\frac{1}{4}$  fathoms water on it, lies in lat.  $12^{\circ} 48' 10''$  S., long.  $45^{\circ} 0' 50''$  E.

(7.) A shoal,  $2\frac{1}{4}$  cables in diameter, with  $4\frac{1}{4}$  fathoms (and possibly less) water on it, lies in lat.  $12^{\circ} 48' 15''$  S., long.  $45^{\circ} 0' 35''$  E.

(8.) A small patch, with  $7\frac{1}{2}$  fathoms water on it, lies in lat.  $12^{\circ} 49' 45''$  S., long.  $45^{\circ} 1' 10''$  E.

NOTE.—Although  $3\frac{1}{4}$  fathoms is the least water as yet found in Great Western passage, it should not be used until thoroughly examined. The leading mark for the passage "Red mount on with Combani," and sketch A, have been removed from the Admiralty charts.

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